

ATTACHMENT D1
RESIDENTIAL NO ACTION LEVEL SCREENING VALUES

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D1. RESIDENTIAL NO ACTION LEVEL SCREENING VALUES

The Risk Methods Document (RMD) (DOE 2011) identified those constituents considered potential chemicals of potential concern (COPCs) at the Paducah Gaseous Diffusion Plant (PGDP) and tabulated their no action levels (NALs). Several constituents were detected in samples evaluated for the Soils Operable Unit (OU) Remedial Investigation for which there were no tabulated child residential NALs in Table A.4 of the RMD. This residential NAL is used in the risk assessment for identification of potential COPCs; therefore, it was necessary to develop child resident NALs consistent with the approach documented in the RMD to identify COPCs in the risk assessment. These constituents are listed in Table D1.1.

Table D1.1. Soils OU Constituents with No Published PGDP Tabulated Residential NALs

<i>Metals</i>	
Lithium	
<i>Organics</i>	
1,1,1-Trichloroethane	Bis(2-ethylhexyl)phthalate
1,1,2-Trichloroethane	Bromomethane
1,1-Dichloroethane	Butyl benzyl phthalate
1,2,4-Trichlorobenzene	Carbon disulfide
1,2-Dichlorobenzene	Chlorobenzene
1,2-Dichloroethane	Dibenzofuran
1,3-Dichlorobenzene	Dibromochloromethane
1,4-Dichlorobenzene	Diethyl phthalate
2,4-Dimethylphenol	Dimethyl phthalate
2,4-Dinitrotoluene	Di-n-butyl phthalate
2,6-Dinitrotoluene	Di-n-octylphthalate
2-Butanone	m,p-Cresol
2-Hexanone	Methylene chloride
2-Methylnaphthalene	N-Nitrosodiphenylamine
2-Methylphenol	Pentachlorophenol
4-Methyl-2-pentanone	Phenanthrene
Acenaphthylene	Phenol
Acetone	Styrene
Benzenemethanol	Toluene
Benzo(ghi)perylene	Vinyl acetate
Benzoic acid	
<i>Radionuclides</i>	
Cesium-134	
Thorium-228	
Thorium-232	

Available toxicity values for these constituents are listed in Table D1.2. The derived cancer and noncancer NALs used as residential screening values to identify COPCs are presented in Table D1.3. Consistent with the RMD, the noncancer NAL is based on the child resident and the NAL for carcinogens is based on the aggregate resident (30-year exposure). This table also provides the maximum detected concentration in surface and subsurface soil samples.

Table D1.2. Toxicity Values and Information Used in PRG Derivation

Chemical Abstract Number	Analyte	GI Absorption Factor (Unitless)	Oral RfD (RfDo)	Absorbed Dose (RfDd)	Inhalation (RfCi)	Inhalation (RfDi)
7439932	Lithium	1.00E+00	2.00E-03	2.00E-03	-	
71556	1,1,1-Trichloroethane	1.00E+00	2.00E+00	2.00E+00	5.00E+00	1.43E+00
79005	1,1,2-Trichloroethane	1.00E+00	4.00E-03	4.00E-03	2.00E-04	5.71E-05
75343	1,1-Dichloroethane	1.00E+00	2.00E-01	2.00E-01	5.00E-01	1.43E-01
120821	1,2,4-Trichlorobenzene	1.00E+00	1.00E-02	1.00E-02	2.00E-03	5.71E-04
95501	1,2-Dichlorobenzene	1.00E+00	9.00E-02	9.00E-02	2.00E-01	5.71E-02
107062	1,2-Dichloroethane	1.00E+00	6.00E-03	6.00E-03	7.00E-03	2.00E-03
541731	1,3-Dichlorobenzene	1.00E+00	-		-	
106467	1,4-Dichlorobenzene	1.00E+00	7.00E-02	7.00E-02	8.00E-01	2.29E-01
105679	2,4-Dimethylphenol	1.00E+00	2.00E-02	2.00E-02	-	
121142	2,4-Dinitrotoluene	1.00E+00	2.00E-03	2.00E-03	-	
606202	2,6-Dinitrotoluene	1.00E+00	1.00E-03	1.00E-03	-	
78933	2-Butanone	1.00E+00	6.00E-01	6.00E-01	5.00E+00	1.43E+00
591786	2-Hexanone	1.00E+00	5.00E-03	5.00E-03	3.00E-02	8.57E-03
91576	2-Methylnaphthalene	1.00E+00	4.00E-03	4.00E-03	-	
95487	2-Methylphenol	1.00E+00	5.00E-02	5.00E-02	6.00E-01	1.71E-01
108101	4-Methyl-2-pentanone	1.00E+00	8.00E-02	8.00E-02	3.00E+00	8.57E-01
208968	Acenaphthylene	1.00E+00	-		-	
67641	Acetone	1.00E+00	9.00E-01	9.00E-01	3.09E+01	8.83E+00
100516	Benzenemethanol	1.00E+00	1.00E-01	1.00E-01	-	
191242	Benzo(ghi)perylene	1.00E+00	-		-	
65850	Benzoic acid	1.00E+00	4.00E+00	4.00E+00	-	
117817	Bis(2-ethylhexyl)phthalate	1.00E+00	2.00E-02	2.00E-02	-	
74839	Bromomethane	1.00E+00	1.40E-03	1.40E-03	5.00E-03	1.43E-03
85687	Butyl benzyl phthalate	1.00E+00	2.00E-01	2.00E-01	-	
75150	Carbon disulfide	1.00E+00	1.00E-01	1.00E-01	7.00E-01	2.00E-01
108907	Chlorobenzene	1.00E+00	2.00E-02	2.00E-02	5.00E-02	1.43E-02
132649	Dibenzofuran	1.00E+00	1.00E-03	1.00E-03	-	
124481	Dibromochloromethane	1.00E+00	2.00E-02	2.00E-02	-	
84662	Diethyl phthalate	1.00E+00	8.00E-01	8.00E-01	-	
131113	Dimethyl phthalate	1.00E+00	-		-	
84742	Di-n-butyl phthalate	1.00E+00	1.00E-01	1.00E-01	-	
117840	Di-n-octylphthalate	1.00E+00	4.00E-02	4.00E-02	-	
P2	m,p-Cresol		5.00E-03	0.00E+00	6.00E-01	1.71E-01
75092	Methylene chloride	1.00E+00	6.00E-02	6.00E-02	1.04E+00	2.97E-01
86306	N-Nitrosodiphenylamine	1.00E+00	-		-	
87865	Pentachlorophenol	1.00E+00	5.00E-03	5.00E-03	-	
85018	Phenanthrene	1.00E+00	-		-	
108952	Phenol	1.00E+00	3.00E-01	3.00E-01	2.00E-01	5.71E-02
100425	Styrene	1.00E+00	2.00E-01	2.00E-01	1.00E+00	2.86E-01
108883	Toluene	1.00E+00	8.00E-02	8.00E-02	5.00E+00	1.43E+00
108054	Vinyl acetate	1.00E+00	1.00E+00	1.00E+00	2.00E-01	5.71E-02
13967709	Cesium-134					
14274829	Thorium-228					
N2608	Thorium-232					

Table D1.2. Toxicity Values and Information Used in PRG Derivation (Continued)

Chemical Abstract Number	Analyte	Oral Slope Factor (SFo)	Oral Slope Factor for Water (SFow)	Oral Slope Factor for Soil (SFos)	Absorbed Dose Slope Factor (SFd)	Inhalation Slope Factor (SFi)	External Exposure Slope Factor (SFe)
7439932	Lithium	-					
71556	1,1,1-Trichloroethane	-					
79005	1,1,2-Trichloroethane	5.70E-02			5.70E-02	5.60E-02	1.60E-05
75343	1,1-Dichloroethane	5.70E-03			5.70E-03	5.60E-03	1.60E-06
120821	1,2,4-Trichlorobenzene	2.90E-02			2.90E-02		
95501	1,2-Dichlorobenzene	-					
107062	1,2-Dichloroethane	9.10E-02			9.10E-02	9.10E-02	2.60E-05
541731	1,3-Dichlorobenzene	-					
106467	1,4-Dichlorobenzene	5.40E-03			5.40E-03	3.85E-02	1.10E-05
105679	2,4-Dimethylphenol	-					
121142	2,4-Dinitrotoluene	3.10E-01			3.10E-01	3.12E-01	8.90E-05
606202	2,6-Dinitrotoluene	-					
78933	2-Butanone	-					
591786	2-Hexanone	-					
91576	2-Methylnaphthalene	-					
95487	2-Methylphenol	-					
108101	4-Methyl-2-pentanone	-					
208968	Acenaphthylene	-					
67641	Acetone	-					
100516	Benzenemethanol	-					
191242	Benzo(ghi)perylene	-					
65850	Benzoic acid	-					
117817	Bis(2-ethylhexyl)phthalate	1.40E-02			1.40E-02	8.40E-03	2.40E-06
74839	Bromomethane	-					
85687	Butyl benzyl phthalate	1.90E-03			1.90E-03		
75150	Carbon disulfide	-					
108907	Chlorobenzene	-					
132649	Dibenzofuran	-					
124481	Dibromochloromethane	8.40E-02			8.40E-02	9.45E-02	2.70E-05
84662	Diethyl phthalate	-					
131113	Dimethyl phthalate	-					
84742	Di-n-butyl phthalate	-					
117840	Di-n-octylphthalate	-					
P2	m,p-Cresol	-					
75092	Methylene chloride	7.50E-03			7.50E-03	1.65E-03	4.70E-07
86306	N-Nitrosodiphenylamine	4.90E-03			4.90E-03	9.10E-03	2.60E-06
87865	Pentachlorophenol	4.00E-01			4.00E-01	1.79E-02	5.10E-06
85018	Phenanthrene	-					
108952	Phenol	-					
100425	Styrene	-					
108883	Toluene	-					
108054	Vinyl acetate	-					
13967709	Cesium-134		4.22E-11	5.81E-11		1.65E-11	7.10E-06
14274829	Thorium-228		1.07E-10	2.89E-10		1.32E-07	5.59E-09
N2608	Thorium-232		1.01E-10	2.31E-10		4.33E-08	3.42E-10

Table D1.2. Toxicity Values and Information Used in PRG Derivation (Continued)

Chemical Abstract Number	Analyte	Volatile Organic?	PEF Res.	VF Res.	EPA Default ABS (Unitless)	KY Default ABS (Unitless)	Permeability Constant
7439932	Lithium		9.30E+08		-	5.00E-02	1.00E-03
71556	1,1,1-Trichloroethane	Yes	9.30E+08	1.36E+03	-	2.50E-01	1.26E-02
79005	1,1,2-Trichloroethane	Yes	9.30E+08	5.16E+03		2.50E-01	5.04E-03
75343	1,1-Dichloroethane	Yes	9.30E+08	1.68E+03		2.50E-01	6.75E-03
120821	1,2,4-Trichlorobenzene		9.30E+08	1.80E+04		1.00E-01	7.05E-02
95501	1,2-Dichlorobenzene		9.30E+08	7.25E+03		1.00E-01	4.46E-02
107062	1,2-Dichloroethane	Yes	9.30E+08	3.47E+03		2.50E-01	4.20E-03
541731	1,3-Dichlorobenzene		9.30E+08	6.17E+03		1.00E-01	5.20E-02
106467	1,4-Dichlorobenzene		9.30E+08	6.50E+03		1.00E-01	4.53E-02
105679	2,4-Dimethylphenol		9.30E+08	2.88E+05	1.00E-01	1.00E-01	1.09E-02
121142	2,4-Dinitrotoluene		9.30E+08		1.02E-01	1.00E-01	3.08E-03
606202	2,6-Dinitrotoluene		9.30E+08	4.00E+05	9.90E-02	1.00E-01	3.70E-03
78933	2-Butanone	Yes	9.30E+08	1.16E+04		2.50E-01	9.62E-04
591786	2-Hexanone	Yes	9.30E+08	1.13E+04		2.50E-01	3.55E-03
91576	2-Methylnaphthalene		9.30E+08	3.47E+04		1.00E-01	9.17E-02
95487	2-Methylphenol		9.30E+08	1.99E+05	1.00E-01	1.00E-01	7.66E-03
108101	4-Methyl-2-pentanone	Yes	9.30E+08	9.18E+03		2.50E-01	3.19E-03
208968	Acenaphthylene		9.30E+08	1.13E+05	1.30E-01	1.00E-01	9.11E-02
67641	Acetone	Yes	9.30E+08	1.34E+04		2.50E-01	5.12E-04
100516	Benzenemethanol		9.30E+08	1.32E+05	1.00E-01	1.00E-01	2.09E-03
191242	Benzo(ghi)perylene		9.30E+08		1.30E-01	1.00E-01	1.12E+00
65850	Benzoic acid		9.30E+08		1.00E-01	1.00E-01	5.65E-03
117817	Bis(2-ethylhexyl)phthalate		9.30E+08		1.00E-01	1.00E-01	1.13E+00
74839	Bromomethane	Yes	9.30E+08	1.27E+03		2.50E-01	2.84E-03
85687	Butyl benzyl phthalate		9.30E+08		1.00E-01	1.00E-01	3.85E-02

Table D1.2. Toxicity Values and Information Used in PRG Derivation (Continued)

Chemical Abstract Number	Analyte	Volatile Organic?	PEF Res.	VF Res.	EPA Default ABS (Unitless)	KY Default ABS (Unitless)	Permeability Constant
75150	Carbon disulfide	Yes	9.30E+08	1.03E+03		2.50E-01	1.14E-02
108907	Chlorobenzene	Yes	9.30E+08	4.13E+03		2.50E-01	2.82E-02
132649	Dibenzofuran		9.30E+08	1.16E+05		1.00E-01	9.75E-02
124481	Dibromochloromethane	Yes	9.30E+08	6.17E+03	1.00E-01	2.50E-01	2.89E-03
84662	Diethyl phthalate		9.30E+08		1.00E-01	1.00E-01	3.60E-03
131113	Dimethyl phthalate		9.30E+08		1.00E-01	1.00E-01	1.47E-03
84742	Di-n-butyl phthalate		9.30E+08		1.00E-01	1.00E-01	4.20E-02
117840	Di-n-octylphthalate		9.30E+08		1.00E-01	1.00E-01	2.43E+00
P2	m,p-Cresol		9.30E+08			1.00E-01	
75092	Methylene chloride	Yes	9.30E+08	1.83E+03		2.50E-01	3.54E-03
86306	N-Nitrosodiphenylamine		9.30E+08	6.28E+05	1.00E-01	1.00E-01	1.45E-02
87865	Pentachlorophenol		9.30E+08		2.50E-01	1.00E-01	1.27E-01
85018	Phenanthrene		9.30E+08	3.82E+05	1.30E-01	1.00E-01	1.44E-01
108952	Phenol		9.30E+08	2.27E+05	1.00E-01	1.00E-01	4.34E-03
100425	Styrene	Yes	9.30E+08	5.79E+03		2.50E-01	3.72E-02
108883	Toluene	Yes	9.30E+08	2.78E+03		2.50E-01	3.11E-02
108054	Vinyl acetate	Yes	9.30E+08	4.13E+03		2.50E-01	1.57E-03
13967709	Cesium-134		9.30E+08				
14274829	Thorium-228		9.30E+08				
N2608	Thorium-232		9.30E+08				

Table D1.3. Residential NAL Development

CAS	Analyte	Noncancer (Child)	Cancer (Child/Adult)	Residential NAL	Maximum Detected Concentration	Units
7439932	Lithium	9.2	n/a	9.2	8.08	mg/kg
71556	1,1,1-Trichloroethane	146	n/a	146	0.61	mg/kg
79005	1,1,2-Trichloroethane	0.023	0.345	0.023	0.006	mg/kg
75343	1,1-Dichloroethane	17.8	1.34	1.34	0.5	mg/kg
120821	1,2,4-Trichlorobenzene	0.786	6.02	0.786	0.0039	mg/kg
95501	1,2-Dichlorobenzene	29.2	n/a	29.2	0.12	mg/kg
107062	1,2-Dichloroethane	0.515	0.155	0.155	0.012	mg/kg
106467	1,4-Dichlorobenzene	77	0.813	0.813	0.0037	mg/kg
105679	2,4-Dimethylphenol	65.2	n/a	65.2	Not detected	mg/kg
121142	2,4-Dinitrotoluene	6.52	0.563	0.563	Not detected	mg/kg
606202	2,6-Dinitrotoluene	3.26	n/a	3.26	Not detected	mg/kg
78933	2-Butanone	578	n/a	578	0.12	mg/kg
591786	2-Hexanone	4.05	n/a	4.05	0.06	mg/kg
91576	2-Methylnaphthalene	13	n/a	13	0.38	mg/kg
95487	2-Methylphenol	154	n/a	154	Not detected	mg/kg
108101	4-Methyl-2-pentanone	113	n/a	113	0.06	mg/kg
67641	Acetone	1340	n/a	1340	0.4	mg/kg
100516	Benzenemethanol	326	n/a	326	0.073	mg/kg
65850	Benzoic acid	13000	n/a	13000	3.8	mg/kg
117817	Bis(2-ethylhexyl)phthalate	65.2	12.5	12.5	15	mg/kg
74839	Bromomethane	0.134	n/a	0.134	Not detected	mg/kg
85687	Butyl benzyl phthalate	652	91.8	91.8	0.5	mg/kg
75150	Carbon disulfide	14.8	n/a	14.8	0.002	mg/kg
108907	Chlorobenzene	4.07	n/a	4.07	0.006	mg/kg
132649	Dibenzofuran	3.26	n/a	3.26	1.65	mg/kg
124481	Dibromochloromethane	34.8	0.242	0.242	Not detected	mg/kg
84662	Diethyl phthalate	2610	n/a	2610	0.52	mg/kg
84742	Di-n-butyl phthalate	326	n/a	326	22	mg/kg
117840	Di-n-octylphthalate	130	n/a	130	0.054	mg/kg
P2	m,p-Cresol	39.1	n/a	39.1	2.3	mg/kg
75092	Methylene chloride	30.2	3.65	3.65	0.14	mg/kg
86306	N-Nitrosodiphenylamine	n/a	32.2	32.2	0.064	mg/kg
87865	Pentachlorophenol	16.3	0.436	0.436	2.1	mg/kg
108952	Phenol	498	n/a	498	17	mg/kg
100425	Styrene	94.3	n/a	94.3	0.00099	mg/kg
108883	Toluene	96.1	n/a	96.1	0.21	mg/kg
108054	Vinyl acetate	18.3	n/a	18.3	Not detected	mg/kg
13967709	Cesium-134	n/a	0.00956	0.00956	0.00302	pCi/g
14274829	Thorium-228	n/a	2.31	2.31	2.21	pCi/g
N2608	Thorium-232	n/a	3.69	3.69	2.03	pCi/g
Constituents with no toxicity values						
541731	1,3-Dichlorobenzene				0.0028	mg/kg
208968	Acenaphthylene				1.2	mg/kg
191242	Benzo(ghi)perylene				28	mg/kg
85018	Phenanthrene				64	mg/kg
131113	Dimethyl phthalate					mg/kg

n/a = no toxicity value available

Bold indicates the analyte was added as a COPC to the Soils OU risk assessment.

The NALs above were used to identify COPCs in surface and subsurface soils in Tables D.4 and D.5 Table D1.3 also includes the maximum detected concentration in soils (surface and subsurface). Only two chemicals (pentachlorophenol and bis-2-ethylhexyl phthalate) were detected above the residential NAL, and this occurred only for one location for each chemical. This is consistent with the RMD, supporting that the tabulated NALs are constituents of primary interest for evaluating risks at PGDP.

The constituents shown in the list below were detected in Soils OU soils, but have no toxicity values for which to determine screening values.

- Noncarcinogenic polycyclic aromatic hydrocarbons (PAHs)
 - Phenanthrene
 - Benzo(ghi)perylene
 - Acenaphthylene

- 1,3-Dichlorobenzene

Three PAHs detected in samples for which there are no toxicity criteria. Similar to anthracene and pyrene, these are not classifiable as to their carcinogenicity to humans. Although no specific reference doses have been provided by the U.S. Environmental Protection Agency (EPA) for these, frequently they are screened based on values derived for pyrene or other noncarcinogenic PAHs. Kentucky Division of Waste Management Superfund Branch, Petroleum Cleanup Section has provided soil action levels [hazard index (HI = 1)] of 3,400 mg/kg for acenaphthylene and phenanthrene consistent with the EPA Regional Screening Level (RSL) for acenaphthene, and 1,700 mg/kg for benzo(ghi)perylene based on the RSL for pyrene.¹

The potential uncertainty in the risk assessment for not incorporating hazard quotients for these PAHs was evaluated based on comparing detected concentrations with the PGDP child resident NAL for pyrene of 81.2 mg/kg. This is lower than NALs for noncancer endpoints for other PAHs (e.g. acenaphthylene child resident NAL is 117 mg/kg). The overall patterns in the data also were considered. This review indicated the following:

- None of the concentrations of acenaphthylene, benzo(ghi)perylene, or acenaphthylene exceeded the child resident NAL for pyrene of 81.2 mg/kg, so none would have been identified as a COPC for further evaluation.

- The highest concentrations of these PAHs were reported in Solid Waste Management Unit 518 Exposure Unit 1. Other PAHs at this location showed pyrene above the NAL at a concentration of 150 mg/kg and, more importantly, carcinogenic PAHs over 100 mg/kg. These levels clearly identify issues to be further considered for PAHs.

Dichlorobenzenes (DCB). According to Agency for Toxic Substances and Disease Registry, “Very little is known about the health effects of 1,3- dichlorobenzene, especially in humans, but they are likely to be similar to those of 1,2- and 1,4-dichlorobenzene.”² The child resident NALs for 1,2-DCB is 29.2 mg/kg and for 1,4-DCB is 0.813 mg/kg, both significantly higher than the maximum reported concentration of 1,3-DCB of 0.0028 mg/kg. In addition, it was infrequently reported. These things suggest this compound would not be a COPC or impact the results of the risk assessment.

¹ Accessed at <http://dep.ky.gov/formslibrary/Documents/DEP7097C.pdf>

² Accessed at <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=703&tid=126>

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ATTACHMENT D2
EPC UNCERTAINTY EVALUATION

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D2. EPC UNCERTAINTY EVALUATION

Calculation of exposure point concentrations (EPCs) for the Soils Operable Unit (OU) included assignment of the average chemical of potential concern (COPC) concentration to grids within an exposure unit (EU) of a solid waste management unit (SWMU) or area of concern (AOC) for which data were not available in order to fill the empty cell. This process has the potential for introducing an uncertainty into those calculations where there are many empty cells. The uncertainties associated with these calculations are discussed below.

For EUs with 10 or more grids, the EPC was calculated using the grid values to determine the 95% upper confidence limit on the mean concentration (UCL 95). The 89 SWMU/EU combinations for which the uncertainty associated with this process applies are listed in Table D2.1.

Table D2.1. SWMU/EU Combinations with Greater than Ten Grids

SWMU	EU	# GRIDS	SWMU	EU	# GRIDS	SWMU	EU	# GRIDS
<i>Former Facilities</i>			194	28	12	195	12	15
1	1	14	194	30	13	195	13	13
1	2	12	<i>Storage Areas</i>			195	14	13
1	3	12	200	1	30	195	15	14
1	4	12	217	1	13	195	16	16
99	1	16	217	2	17	195	17	23
194	1	19	221	1	17	541	1	23
194	2	13	222	1	12	561	1	32
194	3	17	227	1	37	561	2	31
194	4	23	227	2	31	567	3	10
194	5	20	<i>Underground/Tank</i>			567	4	13
194	6	12	165	1	36	<i>Scrap Yards</i>		
194	7	16	<i>Chromium Areas</i>			14	1	12
194	8	12	158	1	24	14	2	12
194	9	13	<i>Soil Piles</i>			14	3	12
194	10	12	138	1	27	14	4	13
194	11	12	138	2	20	14	5	12
194	12	12	180	1	11	14	6	12
194	13	15	180	2	12	14	7	12
194	14	13	180	3	17	14	8	12
194	15	16	180	4	15	14	9	12
194	16	16	181	1	28	14	10	12
194	17	12	195	1	10	518	1	22
194	18	12	195	2	11	520	1	14
194	19	12	195	3	11	520	2	15
194	20	12	195	4	15	520	3	15
194	22	12	195	5	10	520	4	15
194	23	12	195	6	12	520	5	11
194	24	12	195	7	12	<i>PCB Areas</i>		
194	25	10	195	8	12	81	1	26
194	26	12	195	10	12	153	1	10
194	27	12	195	11	12	163	1	26

Using the average concentration for empty cells can impact the EPC estimate, depending on the number of actual results and concentration distributions. If fewer than 10 results are available, the maximum concentration was used as the EPC, and this factor was considered in determining uncertainties. The following are general observations made when reviewing the results for the future industrial worker:

- Many EUs/parameters had values for all or most grids; thus, the UCL 95 is considered the best estimate of the EPC.
- Many contaminants that have significant differences in the EPC and maximum concentrations, however, make no significant contribution to the cumulative excess lifetime cancer risk (ELCR) or hazard index (HI) and/or are not chemicals of concern (COCs).

The grid averaging process described above has the potential to underestimate an EPC compared with one calculated using other protocols. Depending on the data set, this may be a UCL 95 calculated with fewer analytical values or the maximum concentration. By assuming the maximum concentration for each constituent instead of a calculated concentration, a higher ELCR or HI result is obtained. The cumulative ELCR and HI for each EU is used for the initial screening of the results to understand the uncertainty, prior to a more in depth review of the underlying data.

D2.1. EPC UNCERTAINTY FOR THE EU HAZARD INDEX

The HIs for the future industrial worker calculated using the grid based EPCs (HI-EPC) are compared to the HI calculated assuming each COPC was present at its maximum detected concentration (HI Max) (Table D2.2). These HIs are calculated using the current approach in the Risk Methods Document, and do not consider the additional uncertainties as discussed in Section D.6 for metals (DOE 2011).

There was little difference in the impacts on the decision-making process based upon the different methodology. The HIs differed generally by less than a factor of 2, with no difference at all for 13 of these pairs of estimates. Irrespective of the method of calculation, there is no impact on the decision process when both HI estimates are below the benchmark value of 1. Forty-nine of the 89 EUs had HIs < 1 using both estimates of the exposure concentration. For an additional 36 EUs, the HIs were greater than 1 for both methods.

There were three EUs where the HI calculated using the maximum concentration was greater than 1; whereas, the HI using the grid based EPC was below 1. For two of these (SWMU 14/EU 1 and SWMU 520/ EU 3), each grid had a value; thus, the UCL 95 is an appropriate methodology with which to estimate the average.

For SWMU 227/EU 1, the HI was 1.9 using the maximum concentrations and 0.6 using the EPC. This difference is attributed primarily to nickel, which had a maximum concentration of 653 mg/kg, well below the U.S. Environmental Protection Agency's Regional Screening Level of 2,000 mg/kg (HI of 0.1) for the industrial worker and would not be a COC if evaluated consistent with these screening values (EPA 2012). Therefore, it is clear that other uncertainties are critical in the interpretation of the uncertainties for noncancer hazards. This is also clear for the EUs with HI values greater than 20, where vanadium represents most of the HI, with a maximum concentration that would eliminate it as a COC using current toxicity assumptions.

The COCs identified based upon the noncancer hazards were primarily metals, and there were 10 or more results included in the calculations for over 70% of the constituents/EUs. In all cases where an individual metal had a concentration resulting in an HI > 1, there were greater than 10 results; thus, averages were

infrequently used to fill data gaps. For this reason, the EPCs, calculated using the maximums as shown on Table D2.2, likely overestimate the EPCs.

Table D2.2. Comparison of HI for RME Calculations Based on the EPC as Compared to Maximum Concentrations

SWMU	EU	HI Max	HI EPC
1	1	0.2	0.1
1	2	29.7	24.4
1	3	0	0
1	4	0.1	0.1
14	1	1.3	0.8
14	2	4.3	2.3
14	3	4.3	2.5
14	4	5.2	2.7
14	5	4	3.1
14	6	5	3.1
14	7	7.9	4.2
14	8	4.7	3
14	9	8.6	3.9
14	10	7.9	4.7
81	1	7.3	7.3
99	1	1.4	1.4
138	1	3.1	2
138	2	0.4	0.3
158	1	2	1.7
163	1	0	0
165	1	2.5	1.1
180	1	2	1.6
180	2	0.3	0.3
180	3	0.5	0.4
180	4	32.8	32.7
181	1	0.1	0.1
194	1	1	1
194	2	0.1	0.1
194	3	0.4	0.2
194	4	1.3	1.3

SWMU	EU	HI Max	HI EPC
194	5	1.3	1.3
194	6	0.4	0.3
194	7	0.3	0.3
194	8	0.1	0
194	9	0.1	0.1
194	10	0.3	0.3
194	11	1.2	1.2
194	12	0.3	0.3
194	13	0.1	0.1
194	14	0.9	0.9
194	15	0.1	0.1
194	16	27.6	27.6
194	17	0.1	0.1
194	18	0.2	0.2
194	19	0.2	0.2
194	20	27	26.9
194	22	0.1	0
194	23	0.5	0.5
194	24	0.2	0.2
194	25	0.3	0.2
194	26	0.1	0.1
194	27	0.3	0.3
194	28	27.5	27.4
194	30	1.3	1.3
195	1	0.3	0.3
195	2	0.1	0.1
195	3	0.1	0.1
195	4	0.1	0.1
195	5	0.2	0.2
195	6	0.2	0.2

SWMU	EU	HI Max	HI EPC
195	7	0.1	0.1
195	8	27.3	27.3
195	10	0.3	0.3
195	11	54	53.8
195	12	0.2	0.2
195	13	0.2	0.2
195	14	0.2	0.2
195	15	0	0
195	16	0.2	0.2
195	17	0.2	0.2
200	1	1.3	1
217	1	0.7	0.5
217	2	2.2	1.8
221	1	0.4	0.3
222	1	0.3	0.2
227	1	1.9	0.6
227	2	1.4	1.3
518	1	0.5	0.3
520	1	2.9	2
520	2	3.4	2
520	3	1.6	0.7
520	4	2.6	1.9
520	5	0.5	0.3
541	1	52.6	26.4
561	1	60.2	25.6
561	2	55.2	24.6
567	3	0	0
567	4	0	0

D2.2. EPC UNCERTAINTIES FOR THE ELCR

The cumulative grid based ELCR (ELCR-EPC) for the future industrial worker at each EU is compared on Table D2.3 to the estimated risk assuming each COPC was present at its maximum concentration (ELCR Max). In some cases, these values were identical; however, the ELCR-Max was typically less than a factor of 2 higher than the ELCR-EPC.

Table D2.3. Comparison of ELCR for RME Calculations Based on the EPC as compared to Maximum Concentrations

SWMU	EU	ELCR Max	ELCR EPC	SWMU	EU	ELCR Max	ELCR EPC	SWMU	EU	ELCR Max	ELCR EPC
1	1	2.1E-05	1.5E-05	194	4	3.9E-06	3.9E-06	195	6	5.7E-06	5.7E-06
1	2	2.0E-04	1.8E-04	194	5	2.7E-06	2.7E-06	195	7	1.6E-06	1.6E-06
1	3	3.5E-06	2.7E-06	194	6	2.0E-06	2.0E-06	195	8	2.0E-05	1.8E-05
1	4	6.9E-06	5.4E-06	194	7	1.8E-06	1.8E-06	195	10	1.5E-06	1.5E-06
14	1	2.0E-05	1.9E-05	194	8	1.1E-05	1.1E-05	195	11	2.6E-05	1.5E-05
14	2	7.9E-05	6.8E-05	194	9	1.6E-05	1.3E-05	195	12	2.5E-06	2.3E-06
14	3	7.4E-05	6.2E-05	194	10	2.7E-05	2.5E-05	195	13	2.2E-06	2.2E-06
14	4	2.2E-04	1.9E-04	194	11	2.9E-06	2.9E-06	195	14	2.0E-06	2.0E-06
14	5	1.0E-04	9.8E-05	194	12	1.7E-05	1.7E-05	195	15	1.6E-06	1.6E-06
14	6	1.0E-04	8.9E-05	194	13	3.1E-06	3.1E-06	195	16	1.5E-06	1.5E-06
14	7	9.2E-05	7.7E-05	194	14	1.7E-06	1.7E-06	195	17	1.5E-05	1.4E-05
14	8	5.1E-05	4.8E-05	194	15	1.8E-06	1.8E-06	200	1	2.9E-05	2.5E-05
14	9	1.3E-03	9.9E-04	194	16	2.0E-05	1.3E-05	217	1	3.8E-06	3.6E-06
14	10	1.1E-04	1.1E-04	194	17	1.9E-05	1.6E-05	217	2	3.7E-05	2.3E-05
81	1	2.0E-03	8.7E-04	194	18	1.6E-05	1.3E-05	221	1	2.4E-05	2.3E-05
99	1	3.8E-06	3.1E-06	194	19	1.4E-05	1.2E-05	222	1	2.6E-05	2.6E-05
138	1	2.4E-05	1.9E-05	194	20	1.9E-05	1.4E-05	227	1	1.5E-04	6.8E-05
138	2	1.2E-06	1.1E-06	194	22	9.8E-05	6.0E-05	227	2	7.4E-05	3.7E-05
153	1	4.7E-06	4.2E-06	194	23	2.0E-05	1.4E-05	518	1	1.9E-03	6.6E-04
158	1	2.8E-05	2.1E-05	194	24	2.1E-06	2.1E-06	520	1	3.0E-05	1.9E-05
163	1	6.5E-06	4.4E-06	194	25	2.4E-06	2.4E-06	520	2	1.2E-05	8.9E-06
165	1	6.5E-04	2.3E-04	194	26	1.4E-06	1.4E-06	520	3	4.3E-06	4.3E-06
180	1	1.4E-04	7.7E-05	194	27	1.7E-06	1.7E-06	520	4	1.8E-05	1.8E-05
180	2	2.2E-05	1.6E-05	194	28	1.7E-05	1.4E-05	520	5	9.2E-06	9.2E-06
180	3	3.2E-05	1.5E-05	194	30	1.9E-06	1.9E-06	541	1	3.6E-03	1.0E-03
180	4	2.2E-05	1.4E-05	195	1	2.1E-06	2.1E-06	561	1	3.4E-04	1.0E-04
181	1	1.7E-06	1.3E-06	195	2	2.0E-06	2.0E-06	561	2	1.5E-03	4.1E-04
194	1	1.3E-06	1.3E-06	195	3	2.4E-06	2.4E-06	567	3	1.3E-06	1.3E-06
194	2	2.8E-06	2.8E-06	195	4	1.8E-06	1.8E-06	567	4	1.5E-06	1.2E-06
194	3	3.1E-05	1.7E-05	195	5	2.3E-06	2.3E-06				

There were 3 EUs where the ELCR-Max was more than 3 times higher than the ELCR-EPC. These EUs were AOC 541/EU1, SWMU 561/EU1, and SWMU 561/EU2. The ELCR calculated using both methods exceeded 1E-4; thus, the ELCR calculation method did not affect the final conclusion. More importantly, the COCs that represent 80–90% of the total risk (see Table D2.4) have a minimum of 14 results; thus, the ELCR-EPC is assumed to provide an accurate measure of the reasonable maximum exposure (RME).

There are instances where fewer than 10 grids had values to be used in the calculation of the UCL 95; however, in many of these cases, the EPCs were frequently at or near the maximum concentration and/or the contribution to the cumulative ELCR was not significant. The overall impact of the variation in calculation is incorporated into differences in the ELCRs as shown on Table D2.3.

Table D2.4. Risk Drivers for SWMUs with ELCR Uncertainty Greater than a Factor of 3

SWMU	EU	COPC	Units	Number Results	Number Grids	Max	EPC	ELCR Max	ELCR EPC
541	1	Uranium-238	pCi/g	18	23	4540	1000	2.7E-03	5.9E-04
541	1	PCB, Total	mg/kg	21	23	94	60.6	5.0E-04	3.2E-04
561	1	Uranium-238	pCi/g	16	32	413	107	2.4E-04	6.3E-05
561	1	Arsenic	mg/kg	16	32	33.1	16.6	3.3E-05	1.7E-05
561	2	Uranium-238	pCi/g	14	31	1340	400	7.9E-04	2.4E-04
561	2	PCB, Total	mg/kg	27	31	79	16.4	4.2E-04	8.7E-05
561	2	Total PAH	mg/kg	14	31	9.83	2.43	1.7E-04	4.1E-05

There are instances where fewer than 10 grids had values to be used in the calculation of the UCL 95; however, in many of these cases, the EPCs were frequently at or near the maximum concentration and/or the contribution to the cumulative ELCR was not significant. The overall impact of the variation in calculation is incorporated into differences in the ELCRs as shown on Table D2.3.

D2.3. CONCLUSIONS

The EPCs calculated consistent with the approach in the work plan are reasonable estimates of the RME for surface soils. The differences in the HI/ELCR using the maximum concentration as compared to the grid-based approach, as shown on Tables D2.2 and D2.3, typically are less than a factor of 2. The HI/ELCR results appear to yield accurate estimates of the RME. The use of the maximum concentrations will give somewhat higher values; however, in areas where more than 10 results were available, the EPC was often near or equal to the maximum.

The HIs generally were low except in cases where the uncertainties associated with the dermal absorption assumptions were a significant factor in the identification of COCs and the estimate of the RME concentration.

D2.4. REFERENCES

DOE (U. S. Department of Energy) 2011. *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0107&D2/R1, February.

EPA (U.S. Environmental Protection Agency) 2012. “Regional Screening Level (RSL) Summary Table April 2012,” accessed from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf

ATTACHMENT D3
PROUCL OUTPUT

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General UCL Statistics for Full Data Sets

User Selected Options

From File	001-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	14
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	7490	Minimum of Log Data	8.921
Maximum	14300	Maximum of Log Data	9.568
Mean	9751	Mean of log Data	9.174
Median	9345	SD of log Data	0.154
SD	1634		
Coefficient of Variation	0.168		
Skewness	1.746		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.798	Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10525	95% H-UCL	10527
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11498
95% Adjusted-CLT UCL (Chen-1995)	10688	97.5% Chebyshev (MVUE) UCL	12256
95% Modified-t UCL (Johnson-1978)	10559	99% Chebyshev (MVUE) UCL	13745

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	34.09	Data do not follow a Discernable Distribution (0.05)	
Theta Star	286.1		
MLE of Mean	9751		
MLE of Standard Deviation	1670		
nu star	954.4		
Approximate Chi Square Value (.05)	883.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	10470
Adjusted Chi Square Value	874.7	95% Jackknife UCL	10525
		95% Standard Bootstrap UCL	10425
Anderson-Darling Test Statistic	1.13	95% Bootstrap-t UCL	11031
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	15000
Kolmogorov-Smirnov Test Statistic	0.268	95% Percentile Bootstrap UCL	10472
Kolmogorov-Smirnov 5% Critical Value	0.228	95% BCA Bootstrap UCL	10738
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11655
		97.5% Chebyshev(Mean, Sd) UCL	12479
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14097
95% Approximate Gamma UCL	10532		
95% Adjusted Gamma UCL	10640		

Potential UCL to Use

	Use 95% Student's-t UCL	10525
	or 95% Modified-t UCL	10559

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.23	Minimum of Log Data	-1.471
Maximum		5 Maximum of Log Data	1.609
Mean	1.3	Mean of log Data	-0.126
Median	0.786	SD of log Data	0.894
SD	1.345		
Coefficient of Variation	1.035		
Skewness	2.054		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.734	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.937	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.517
95% Adjusted-CLT UCL (Chen-1995)	2.102	95% Chebyshev (MVUE) UCL	2.681
95% Modified-t UCL (Johnson-1978)	1.97	97.5% Chebyshev (MVUE) UCL	3.294
		99% Chebyshev (MVUE) UCL	4.496

Gamma Distribution Test

k star (bias corrected)	1.171	Data Distribution	
Theta Star	1.11	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	1.3		
MLE of Standard Deviation	1.201		
nu star	32.8		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0312	Nonparametric Statistics	
Adjusted Chi Square Value	19.44	95% CLT UCL	1.891
		95% Jackknife UCL	1.937
		95% Standard Bootstrap UCL	1.882

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.52	95% Bootstrap-t UCL	2.837
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	5.071
Kolmogorov-Smirnov Test Statistic	0.18	95% Percentile Bootstrap UCL	1.905
Kolmogorov-Smirnov 5% Critical Value	0.233	95% BCA Bootstrap UCL	2.059
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.867
		97.5% Chebyshev(Mean, Sd) UCL	3.546
		99% Chebyshev(Mean, Sd) UCL	4.878

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.059
95% Adjusted Gamma UCL	2.193

Potential UCL to Use

Use 95% Approximate Gamma UCL 2.059

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	1.58	Minimum of Log Data	0.457
Maximum	10.7	Maximum of Log Data	2.37
Mean	5.406	Mean of log Data	1.545
Median	5.47	SD of log Data	0.581
SD	2.825		
Coefficient of Variation	0.523		
Skewness	0.625		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.743	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.856
95% Adjusted-CLT UCL (Chen-1995)	6.783	95% Chebyshev (MVUE) UCL	9.318
95% Modified-t UCL (Johnson-1978)	6.764	97.5% Chebyshev (MVUE) UCL	10.98
		99% Chebyshev (MVUE) UCL	14.25

Gamma Distribution Test

k star (bias corrected)	2.929	Data Distribution	
Theta Star	1.846	Data appear Normal at 5% Significance Level	
MLE of Mean	5.406		
MLE of Standard Deviation	3.159		
nu star	82.01		
Approximate Chi Square Value (.05)	62.14	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	6.648
Adjusted Chi Square Value	59.85	95% Jackknife UCL	6.743
		95% Standard Bootstrap UCL	6.588
Anderson-Darling Test Statistic	0.297	95% Bootstrap-t UCL	6.933
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	6.965
Kolmogorov-Smirnov Test Statistic	0.14	95% Percentile Bootstrap UCL	6.679
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	6.75
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.697
		97.5% Chebyshev(Mean, Sd) UCL	10.12
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.92
95% Approximate Gamma UCL	7.134		
95% Adjusted Gamma UCL	7.407		

Potential UCL to Use

Use 95% Student's-t UCL 6.743

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	51.8	Minimum of Log Data	3.947
Maximum	247	Maximum of Log Data	5.509
Mean	123.7	Mean of log Data	4.749
Median	121.5	SD of log Data	0.389
SD	48.06		
Coefficient of Variation	0.389		
Skewness	1.066		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	146.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	154.1
95% Adjusted-CLT UCL (Chen-1995)	148.7	95% Chebyshev (MVUE) UCL	181
95% Modified-t UCL (Johnson-1978)	147	97.5% Chebyshev (MVUE) UCL	205.7
		99% Chebyshev (MVUE) UCL	254.3

Gamma Distribution Test

k star (bias corrected)	5.897	Data Distribution	
Theta Star	20.97	Data appear Normal at 5% Significance Level	
MLE of Mean	123.7		
MLE of Standard Deviation	50.93		
nu star	165.1		
Approximate Chi Square Value (.05)	136.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	144.8
Adjusted Chi Square Value	132.9	95% Jackknife UCL	146.4
		95% Standard Bootstrap UCL	143.8
Anderson-Darling Test Statistic	0.343	95% Bootstrap-t UCL	150.1
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	160.3
Kolmogorov-Smirnov Test Statistic	0.17	95% Percentile Bootstrap UCL	144
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	146.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	179.7
		97.5% Chebyshev(Mean, Sd) UCL	203.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	251.5
95% Approximate Gamma UCL	149.7		
95% Adjusted Gamma UCL	153.6		

Potential UCL to Use

Use 95% Student's-t UCL 146.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.312	Minimum of Log Data	-1.165
Maximum	7.8	Maximum of Log Data	2.054
Mean	1.127	Mean of log Data	-0.333
Median	0.63	SD of log Data	0.73
SD	1.925		
Coefficient of Variation	1.709		
Skewness	3.71		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.361	Shapiro Wilk Test Statistic	0.621
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	2.038	95% H-UCL	1.515
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.734
95% Adjusted-CLT UCL (Chen-1995)	2.518	97.5% Chebyshev (MVUE) UCL	2.089
95% Modified-t UCL (Johnson-1978)	2.123	99% Chebyshev (MVUE) UCL	2.786

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.026	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.098		
MLE of Mean	1.127		
MLE of Standard Deviation	1.112		
nu star	28.74		
Approximate Chi Square Value (.05)	17.51	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	1.973
Adjusted Chi Square Value	16.35	95% Jackknife UCL	2.038
		95% Standard Bootstrap UCL	1.942
Anderson-Darling Test Statistic	3.056	95% Bootstrap-t UCL	10.79
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	8.052
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	2.143
Kolmogorov-Smirnov 5% Critical Value	0.234	95% BCA Bootstrap UCL	2.658
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.37
		97.5% Chebyshev(Mean, Sd) UCL	4.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.246
95% Approximate Gamma UCL	1.85		
95% Adjusted Gamma UCL	1.98		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 3.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0489	Minimum of Log Data	-3.018
Maximum	3.08	Maximum of Log Data	1.125
Mean	0.632	Mean of log Data	-1.531
Median	0.13	SD of log Data	1.449
SD	1.027		
Coefficient of Variation	1.625		
Skewness	1.962		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.617	Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.117	95% H-UCL	2.616
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.572
95% Adjusted-CLT UCL (Chen-1995)	1.237	97.5% Chebyshev (MVUE) UCL	2.017
95% Modified-t UCL (Johnson-1978)	1.141	99% Chebyshev (MVUE) UCL	2.892

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.503	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.256		
MLE of Mean	0.632		
MLE of Standard Deviation	0.891		
nu star	14.09		
Approximate Chi Square Value (.05)	6.63	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	1.083
Adjusted Chi Square Value	5.964	95% Jackknife UCL	1.117
		95% Standard Bootstrap UCL	1.062
Anderson-Darling Test Statistic	1.312	95% Bootstrap-t UCL	2.042
Anderson-Darling 5% Critical Value	0.786	95% Hall's Bootstrap UCL	2.716
Kolmogorov-Smirnov Test Statistic	0.317	95% Percentile Bootstrap UCL	1.068
Kolmogorov-Smirnov 5% Critical Value	0.24	95% BCA Bootstrap UCL	1.25
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.828
		97.5% Chebyshev(Mean, Sd) UCL	2.345
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.361
95% Approximate Gamma UCL	1.342		
95% Adjusted Gamma UCL	1.492		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.828

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.125	Minimum of Log Data	-2.079
Maximum	0.753	Maximum of Log Data	-0.284
Mean	0.527	Mean of log Data	-0.698
Median	0.527	SD of log Data	0.415
SD	0.137		
Coefficient of Variation	0.26		
Skewness	-1.676		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.619	Shapiro Wilk Test Statistic	0.483
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.591	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.682
95% Adjusted-CLT UCL (Chen-1995)	0.569	95% Chebyshev (MVUE) UCL	0.804
95% Modified-t UCL (Johnson-1978)	0.589	97.5% Chebyshev (MVUE) UCL	0.919
		99% Chebyshev (MVUE) UCL	1.144

Gamma Distribution Test

k star (bias corrected)	7.108	Data Distribution	
Theta Star	0.0741	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.527		
MLE of Standard Deviation	0.198		
nu star	199		
Approximate Chi Square Value (.05)	167.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.587
Adjusted Chi Square Value	163.5	95% Jackknife UCL	0.591
		95% Standard Bootstrap UCL	0.586
Anderson-Darling Test Statistic	3.116	95% Bootstrap-t UCL	0.58
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	0.579
Kolmogorov-Smirnov Test Statistic	0.473	95% Percentile Bootstrap UCL	0.58
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	0.568
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.686
		97.5% Chebyshev(Mean, Sd) UCL	0.755
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.89
95% Approximate Gamma UCL	0.626		
95% Adjusted Gamma UCL	0.641		

Potential UCL to Use	Use 95% Student's-t UCL	0.591
	or 95% Modified-t UCL	0.589

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	11
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Raw Statistics

Minimum	5.5	Minimum of Log Data	1.705
Maximum	56.2	Maximum of Log Data	4.029
Mean	17.72	Mean of log Data	2.751
Median	14.8	SD of log Data	0.481
SD	11.62		
Coefficient of Variation	0.656		
Skewness	3.125		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.577	Shapiro Wilk Test Statistic	0.801
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	23.22	95% H-UCL	22.97
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	27.42
95% Adjusted-CLT UCL (Chen-1995)	25.6	97.5% Chebyshev (MVUE) UCL	31.75
95% Modified-t UCL (Johnson-1978)	23.66	99% Chebyshev (MVUE) UCL	40.25

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	3.344	Data Distribution	
Theta Star	5.3	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	17.72		
MLE of Standard Deviation	9.691		
nu star	93.63		
Approximate Chi Square Value (.05)	72.31	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	22.83
Adjusted Chi Square Value	69.83	95% Jackknife UCL	23.22
		95% Standard Bootstrap UCL	22.83
Anderson-Darling Test Statistic	1.591	95% Bootstrap-t UCL	32.02
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	47.31
Kolmogorov-Smirnov Test Statistic	0.263	95% Percentile Bootstrap UCL	23.09
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	26.61
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	31.26
		97.5% Chebyshev(Mean, Sd) UCL	37.12
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	48.63
95% Approximate Gamma UCL	22.95		
95% Adjusted Gamma UCL	23.76		

Potential UCL to Use

Use 95% Student's-t UCL	23.22
or 95% Modified-t UCL	23.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	3.79	Minimum of Log Data	1.332
Maximum	15.4	Maximum of Log Data	2.734
Mean	8.784	Mean of log Data	2.082
Median	9.045	SD of log Data	0.458
SD	3.693		
Coefficient of Variation	0.42		
Skewness	0.235		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.957	Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.53	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.49
95% Adjusted-CLT UCL (Chen-1995)	10.47	95% Chebyshev (MVUE) UCL	13.66
95% Modified-t UCL (Johnson-1978)	10.54	97.5% Chebyshev (MVUE) UCL	15.75
		99% Chebyshev (MVUE) UCL	19.85

Gamma Distribution Test

k star (bias corrected)	4.474	Data Distribution	
Theta Star	1.964	Data appear Normal at 5% Significance Level	
MLE of Mean	8.784		
MLE of Standard Deviation	4.153		
nu star	125.3		
Approximate Chi Square Value (.05)	100.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	10.41
Adjusted Chi Square Value	97.46	95% Jackknife UCL	10.53
		95% Standard Bootstrap UCL	10.32
Anderson-Darling Test Statistic	0.267	95% Bootstrap-t UCL	10.76
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	10.41
Kolmogorov-Smirnov Test Statistic	0.138	95% Percentile Bootstrap UCL	10.38
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	10.53
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.09
		97.5% Chebyshev(Mean, Sd) UCL	14.95
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.6
95% Approximate Gamma UCL	10.96		
95% Adjusted Gamma UCL	11.29		

Potential UCL to Use

Use 95% Student's-t UCL 10.53

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	254	Minimum of Log Data	5.537
Maximum	1990	Maximum of Log Data	7.596
Mean	728.7	Mean of log Data	6.402
Median	617.5	SD of log Data	0.632
SD	489.6		
Coefficient of Variation	0.672		
Skewness	1.426		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.857	Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	960.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1094
95% Adjusted-CLT UCL (Chen-1995)	997.2	95% Chebyshev (MVUE) UCL	1280
95% Modified-t UCL (Johnson-1978)	968.8	97.5% Chebyshev (MVUE) UCL	1521
		99% Chebyshev (MVUE) UCL	1994

Gamma Distribution Test

k star (bias corrected)	2.246	Data Distribution	
Theta Star	324.4	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	728.7		
MLE of Standard Deviation	486.2		
nu star	62.9		
Approximate Chi Square Value (.05)	45.65	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	943.9
Adjusted Chi Square Value	43.71	95% Jackknife UCL	960.4
		95% Standard Bootstrap UCL	935.7
Anderson-Darling Test Statistic	0.363	95% Bootstrap-t UCL	1047
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	1138
Kolmogorov-Smirnov Test Statistic	0.159	95% Percentile Bootstrap UCL	948.4
Kolmogorov-Smirnov 5% Critical Value	0.231	95% BCA Bootstrap UCL	999
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1299
		97.5% Chebyshev(Mean, Sd) UCL	1546
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2031
95% Approximate Gamma UCL	1004		
95% Adjusted Gamma UCL	1049		

Potential UCL to Use

Use 95% Approximate Gamma UCL 1004

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.0015	Minimum of Log Data	-6.516
Maximum	0.663	Maximum of Log Data	-0.411
Mean	0.23	Mean of log Data	-1.907
Median	0.23	SD of log Data	1.482
SD	0.147		
Coefficient of Variation	0.638		
Skewness	1.709		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.613	Shapiro Wilk Test Statistic	0.539
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.002
95% Adjusted-CLT UCL (Chen-1995)	0.314	95% Chebyshev (MVUE) UCL	1.142
95% Modified-t UCL (Johnson-1978)	0.303	97.5% Chebyshev (MVUE) UCL	1.468
		99% Chebyshev (MVUE) UCL	2.109

Gamma Distribution Test

k star (bias corrected)	1.053	Data Distribution	
Theta Star	0.219	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.23		
MLE of Standard Deviation	0.225		
nu star	29.48		
Approximate Chi Square Value (.05)	18.08	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.295
Adjusted Chi Square Value	16.91	95% Jackknife UCL	0.3
		95% Standard Bootstrap UCL	0.294
Anderson-Darling Test Statistic	2.958	95% Bootstrap-t UCL	0.32
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	0.632
Kolmogorov-Smirnov Test Statistic	0.474	95% Percentile Bootstrap UCL	0.292
Kolmogorov-Smirnov 5% Critical Value	0.234	95% BCA Bootstrap UCL	0.307
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.402
		97.5% Chebyshev(Mean, Sd) UCL	0.476
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.621
95% Approximate Gamma UCL	0.376		
95% Adjusted Gamma UCL	0.402		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.402
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Nickel

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	13
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Raw Statistics

		Log-transformed Statistics	
Minimum	7.21	Minimum of Log Data	1.975
Maximum	26.8	Maximum of Log Data	3.288
Mean	13.68	Mean of log Data	2.552
Median	12.3	SD of log Data	0.368
SD	5.232		
Coefficient of Variation	0.382		
Skewness	1.12		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.967
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16.76
95% Adjusted-CLT UCL (Chen-1995)	16.43	95% Chebyshev (MVUE) UCL	19.61
95% Modified-t UCL (Johnson-1978)	16.22	97.5% Chebyshev (MVUE) UCL	22.18
		99% Chebyshev (MVUE) UCL	27.23

Gamma Distribution Test

k star (bias corrected)	6.362	Data Distribution	
Theta Star	2.15	Data appear Normal at 5% Significance Level	
MLE of Mean	13.68		
MLE of Standard Deviation	5.423		
nu star	178.1		
Approximate Chi Square Value (.05)	148.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	15.98
Adjusted Chi Square Value	144.6	95% Jackknife UCL	16.15
		95% Standard Bootstrap UCL	15.91
Anderson-Darling Test Statistic	0.254	95% Bootstrap-t UCL	16.72
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	17.61
Kolmogorov-Smirnov Test Statistic	0.133	95% Percentile Bootstrap UCL	16
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	16.34
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	19.77
		97.5% Chebyshev(Mean, Sd) UCL	22.41
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	27.59
95% Approximate Gamma UCL	16.43		
95% Adjusted Gamma UCL	16.84		

Potential UCL to Use

Use 95% Student's-t UCL	16.15
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.017	Minimum of Log Data	-4.075
Maximum	0.2	Maximum of Log Data	-1.609
Mean	0.0431	Mean of log Data	-3.723
Median	0.017	SD of log Data	0.894
SD	0.0663		
Coefficient of Variation	1.539		
Skewness	2.295		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.429	Shapiro Wilk Test Statistic	0.429
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0744	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0691
95% Adjusted-CLT UCL (Chen-1995)	0.0838	95% Chebyshev (MVUE) UCL	0.0736
95% Modified-t UCL (Johnson-1978)	0.0762	97.5% Chebyshev (MVUE) UCL	0.0904
		99% Chebyshev (MVUE) UCL	0.123

Gamma Distribution Test

k star (bias corrected)	0.833	Data Distribution	
Theta Star	0.0517	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0431		
MLE of Standard Deviation	0.0472		
nu star	23.31		
Approximate Chi Square Value (.05)	13.33	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.0722
Adjusted Chi Square Value	12.33	95% Jackknife UCL	0.0744
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.293	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.531	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.235	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.12
		97.5% Chebyshev(Mean, Sd) UCL	0.154
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.219
95% Approximate Gamma UCL	0.0753		
95% Adjusted Gamma UCL	0.0814		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Plutonium-239/240

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.241	Minimum of Log Data	-1.423
Maximum	9.05	Maximum of Log Data	2.203
Mean	4.08	Mean of log Data	1.238
Median	4.08	SD of log Data	0.801
SD	1.77		
Coefficient of Variation	0.434		
Skewness	1.048		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.614	Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.918	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.25
95% Adjusted-CLT UCL (Chen-1995)	5	95% Chebyshev (MVUE) UCL	9.201
95% Modified-t UCL (Johnson-1978)	4.94	97.5% Chebyshev (MVUE) UCL	11.18
		99% Chebyshev (MVUE) UCL	15.08

Gamma Distribution Test

k star (bias corrected)	2.504	Data Distribution	
Theta Star	1.629	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.08		
MLE of Standard Deviation	2.578		
nu star	70.12		
Approximate Chi Square Value (.05)	51.84	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	4.858
Adjusted Chi Square Value	49.76	95% Jackknife UCL	4.918
		95% Standard Bootstrap UCL	4.842
Anderson-Darling Test Statistic	3.122	95% Bootstrap-t UCL	4.971
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	6.054
Kolmogorov-Smirnov Test Statistic	0.432	95% Percentile Bootstrap UCL	4.79
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	4.984
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.142
		97.5% Chebyshev(Mean, Sd) UCL	7.034
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.786
95% Approximate Gamma UCL	5.519		
95% Adjusted Gamma UCL	5.75		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	6.142
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	9
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.116	Minimum of Log Data	-2.151
Maximum	1.56	Maximum of Log Data	0.445
Mean	0.382	Mean of log Data	-1.433
Median	0.136	SD of log Data	0.938
SD	0.438		
Coefficient of Variation	1.147		
Skewness	1.915		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.676	Shapiro Wilk Test Statistic	0.752
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.589	95% H-UCL	0.746
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.774
95% Adjusted-CLT UCL (Chen-1995)	0.638	97.5% Chebyshev (MVUE) UCL	0.955
95% Modified-t UCL (Johnson-1978)	0.599	99% Chebyshev (MVUE) UCL	1.31

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.993	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.385		
MLE of Mean	0.382		
MLE of Standard Deviation	0.383		
nu star	27.8		
Approximate Chi Square Value (.05)	16.77	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.574
Adjusted Chi Square Value	15.65	95% Jackknife UCL	0.589
		95% Standard Bootstrap UCL	0.571
Anderson-Darling Test Statistic	1.731	95% Bootstrap-t UCL	0.804
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	1.369
Kolmogorov-Smirnov Test Statistic	0.366	95% Percentile Bootstrap UCL	0.583
Kolmogorov-Smirnov 5% Critical Value	0.234	95% BCA Bootstrap UCL	0.651
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.892
		97.5% Chebyshev(Mean, Sd) UCL	1.113
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.547
95% Approximate Gamma UCL	0.633		
95% Adjusted Gamma UCL	0.679		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.892
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	1.73	Minimum of Log Data	0.548
Maximum	65	Maximum of Log Data	4.174
Mean	29.18	Mean of log Data	3.205
Median	29.18	SD of log Data	0.801
SD	12.73		
Coefficient of Variation	0.436		
Skewness	1.075		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	35.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	58.93
95% Adjusted-CLT UCL (Chen-1995)	35.82	95% Chebyshev (MVUE) UCL	65.73
95% Modified-t UCL (Johnson-1978)	35.36	97.5% Chebyshev (MVUE) UCL	79.89
		99% Chebyshev (MVUE) UCL	107.7

Gamma Distribution Test

k star (bias corrected)	2.499	Data Distribution	
Theta Star	11.68	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	29.18		
MLE of Standard Deviation	18.46		
nu star	69.96		
Approximate Chi Square Value (.05)	51.71	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	34.77
Adjusted Chi Square Value	49.63	95% Jackknife UCL	35.2
		95% Standard Bootstrap UCL	34.61
Anderson-Darling Test Statistic	3.103	95% Bootstrap-t UCL	35.58
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	43.81
Kolmogorov-Smirnov Test Statistic	0.432	95% Percentile Bootstrap UCL	34.89
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	35.66
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	44.01
		97.5% Chebyshev(Mean, Sd) UCL	50.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	63.03
95% Approximate Gamma UCL	39.48		
95% Adjusted Gamma UCL	41.13		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 44.01

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Trichloroethene

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	#####	Minimum of Log Data	-7.013
Maximum	0.69	Maximum of Log Data	-0.371
Mean	0.358	Mean of log Data	-2.451
Median	0.5	SD of log Data	2.654
SD	0.279		
Coefficient of Variation	0.779		
Skewness	-0.528		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.757	Shapiro Wilk Test Statistic	0.717
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.49	95% H-UCL	245.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	6.033
95% Adjusted-CLT UCL (Chen-1995)	0.469	97.5% Chebyshev (MVUE) UCL	8.04
95% Modified-t UCL (Johnson-1978)	0.488	99% Chebyshev (MVUE) UCL	11.98

Gamma Distribution Test

k star (bias corrected)	0.404	Data Distribution	
Theta Star	0.887	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.358		
MLE of Standard Deviation	0.564		
nu star	11.3		
Approximate Chi Square Value (.05)	4.771	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.481
Adjusted Chi Square Value	4.221	95% Jackknife UCL	0.49
		95% Standard Bootstrap UCL	0.476
Anderson-Darling Test Statistic	2.152	95% Bootstrap-t UCL	0.476
Anderson-Darling 5% Critical Value	0.802	95% Hall's Bootstrap UCL	0.46
Kolmogorov-Smirnov Test Statistic	0.409	95% Percentile Bootstrap UCL	0.477
Kolmogorov-Smirnov 5% Critical Value	0.243	95% BCA Bootstrap UCL	0.472
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.683
		97.5% Chebyshev(Mean, Sd) UCL	0.824
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.1
95% Approximate Gamma UCL	0.848		
95% Adjusted Gamma UCL	0.959		

Potential UCL to Use

		Use 99% Chebyshev (Mean, Sd) UCL	1.1
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.024	Minimum of Log Data	-3.73
Maximum	0.193	Maximum of Log Data	-1.645
Mean	0.0895	Mean of log Data	-2.492
Median	0.0895	SD of log Data	0.442
SD	0.0356		
Coefficient of Variation	0.397		
Skewness	1.54		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.625	Shapiro Wilk Test Statistic	0.642
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.106	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.117
95% Adjusted-CLT UCL (Chen-1995)	0.109	95% Chebyshev (MVUE) UCL	0.138
95% Modified-t UCL (Johnson-1978)	0.107	97.5% Chebyshev (MVUE) UCL	0.159
		99% Chebyshev (MVUE) UCL	0.199

Gamma Distribution Test

k star (bias corrected)	5.177	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0173		
MLE of Mean	0.0895		
MLE of Standard Deviation	0.0394		
nu star	145		
Approximate Chi Square Value (.05)	118.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.105
Adjusted Chi Square Value	114.9	95% Jackknife UCL	0.106
		95% Standard Bootstrap UCL	0.105
Anderson-Darling Test Statistic	2.64	95% Bootstrap-t UCL	0.11
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	0.2
Kolmogorov-Smirnov Test Statistic	0.409	95% Percentile Bootstrap UCL	0.104
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	0.109
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.131
		97.5% Chebyshev(Mean, Sd) UCL	0.149
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.184
95% Approximate Gamma UCL	0.11		
95% Adjusted Gamma UCL	0.113		

Potential UCL to Use	Use 95% Student's-t UCL	0.106
	or 95% Modified-t UCL	0.107

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Uranium-238

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.894	Minimum of Log Data	-0.112
Maximum	3.31	Maximum of Log Data	1.197
Mean	1.718	Mean of log Data	0.499
Median	1.718	SD of log Data	0.302
SD	0.541		
Coefficient of Variation	0.315		
Skewness	1.714		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.61	Shapiro Wilk Test Statistic	0.66
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.974	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.02
95% Adjusted-CLT UCL (Chen-1995)	2.026	95% Chebyshev (MVUE) UCL	2.328
95% Modified-t UCL (Johnson-1978)	1.985	97.5% Chebyshev (MVUE) UCL	2.592
		99% Chebyshev (MVUE) UCL	3.111

Gamma Distribution Test

k star (bias corrected)	9.493	Data Distribution	
Theta Star	0.181	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.718		
MLE of Standard Deviation	0.557		
nu star	265.8		
Approximate Chi Square Value (.05)	229.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	1.955
Adjusted Chi Square Value	224.5	95% Jackknife UCL	1.974
		95% Standard Bootstrap UCL	1.957
Anderson-Darling Test Statistic	2.674	95% Bootstrap-t UCL	2.047
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	3.328
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL	1.945
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.348
		97.5% Chebyshev(Mean, Sd) UCL	2.621
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.156
95% Approximate Gamma UCL	1.993		
95% Adjusted Gamma UCL	2.033		

Potential UCL to Use		Use 95% Student's-t UCL	1.974
		or 95% Modified-t UCL	1.985

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	14
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Raw Statistics

		Log-transformed Statistics	
Minimum	17.2	Minimum of Log Data	2.845
Maximum	53.3	Maximum of Log Data	3.976
Mean	28.18	Mean of log Data	3.293
Median	24.7	SD of log Data	0.303
SD	9.458		
Coefficient of Variation	0.336		
Skewness	1.491		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	32.65	95% H-UCL	33.08
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	38.14
95% Adjusted-CLT UCL (Chen-1995)	33.41	97.5% Chebyshev (MVUE) UCL	42.49
95% Modified-t UCL (Johnson-1978)	32.82	99% Chebyshev (MVUE) UCL	51.02

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	8.857	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.182		
MLE of Mean	28.18		
MLE of Standard Deviation	9.469		
nu star	248		
Approximate Chi Square Value (.05)	212.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	32.34
Adjusted Chi Square Value	208.2	95% Jackknife UCL	32.65
		95% Standard Bootstrap UCL	32.25
Anderson-Darling Test Statistic	0.5	95% Bootstrap-t UCL	34.46
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	36.1
Kolmogorov-Smirnov Test Statistic	0.206	95% Percentile Bootstrap UCL	32.16
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	33.22
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.2
		97.5% Chebyshev(Mean, Sd) UCL	43.96
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	53.33
95% Approximate Gamma UCL	32.88		
95% Adjusted Gamma UCL	33.57		

Potential UCL to Use

Use 95% Approximate Gamma UCL	32.88
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	7260	Log-transformed Statistics	
Maximum	12400	Minimum of Log Data	8.89
Mean	8464	Maximum of Log Data	9.425
Median	8195	Mean of log Data	9.035
SD	1308	SD of log Data	0.134
Coefficient of Variation	0.155		
Skewness	2.831		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.645	Shapiro Wilk Test Statistic	0.715
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9142	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9099
95% Adjusted-CLT UCL (Chen-1995)	9415	95% Chebyshev (MVUE) UCL	9883
95% Modified-t UCL (Johnson-1978)	9193	97.5% Chebyshev (MVUE) UCL	10499
		99% Chebyshev (MVUE) UCL	11711

Gamma Distribution Test

k star (bias corrected)	41.8	Data Distribution	
Theta Star	202.5	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8464		
MLE of Standard Deviation	1309		
nu star	1003		
Approximate Chi Square Value (.05)	930.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9085
Adjusted Chi Square Value	919.9	95% Jackknife UCL	9142
		95% Standard Bootstrap UCL	9070
Anderson-Darling Test Statistic	1.405	95% Bootstrap-t UCL	10052
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	11769
Kolmogorov-Smirnov Test Statistic	0.307	95% Percentile Bootstrap UCL	9142
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	9448
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10110
		97.5% Chebyshev(Mean, Sd) UCL	10822
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12221
95% Approximate Gamma UCL	9124		
95% Adjusted Gamma UCL	9229		

Potential UCL to Use

	Use 95% Student's-t UCL	9142
	or 95% Modified-t UCL	9193

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	3.92	Minimum of Log Data	1.366
Maximum	11.5	Maximum of Log Data	2.442
Mean	6.292	Mean of log Data	1.767
Median	5.445	SD of log Data	0.389
SD	2.584		
Coefficient of Variation	0.411		
Skewness	0.866		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.859	Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.631	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.999
95% Adjusted-CLT UCL (Chen-1995)	7.718	95% Chebyshev (MVUE) UCL	9.391
95% Modified-t UCL (Johnson-1978)	7.663	97.5% Chebyshev (MVUE) UCL	10.74
		99% Chebyshev (MVUE) UCL	13.39

Gamma Distribution Test

k star (bias corrected)	5.394	Data Distribution	
Theta Star	1.167	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	6.292		
MLE of Standard Deviation	2.709		
nu star	129.4		
Approximate Chi Square Value (.05)	104.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	7.519
Adjusted Chi Square Value	100.7	95% Jackknife UCL	7.631
		95% Standard Bootstrap UCL	7.479
Anderson-Darling Test Statistic	0.655	95% Bootstrap-t UCL	8.016
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	7.579
Kolmogorov-Smirnov Test Statistic	0.232	95% Percentile Bootstrap UCL	7.559
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	7.661
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.543
		97.5% Chebyshev(Mean, Sd) UCL	10.95
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.71
95% Approximate Gamma UCL	7.819		
95% Adjusted Gamma UCL	8.087		

Potential UCL to Use

Use 95% Approximate Gamma UCL 7.819

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	98.9	Log-transformed Statistics	
Maximum	181	Minimum of Log Data	4.594
Mean	144	Maximum of Log Data	5.198
Median	143.5	Mean of log Data	4.955
SD	25.53	SD of log Data	0.183
Coefficient of Variation	0.177		
Skewness	-0.112		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	157.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	159.6
95% Adjusted-CLT UCL (Chen-1995)	155.9	95% Chebyshev (MVUE) UCL	177.4
95% Modified-t UCL (Johnson-1978)	157.2	97.5% Chebyshev (MVUE) UCL	191.8
		99% Chebyshev (MVUE) UCL	220.2

Gamma Distribution Test

k star (bias corrected)	25.13	Data Distribution	
Theta Star	5.73	Data appear Normal at 5% Significance Level	
MLE of Mean	144		
MLE of Standard Deviation	28.73		
nu star	603.2		
Approximate Chi Square Value (.05)	547.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	156.1
Adjusted Chi Square Value	539.1	95% Jackknife UCL	157.2
		95% Standard Bootstrap UCL	155.5
Anderson-Darling Test Statistic	0.274	95% Bootstrap-t UCL	157.2
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	155.5
Kolmogorov-Smirnov Test Statistic	0.142	95% Percentile Bootstrap UCL	156
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	154.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	176.1
		97.5% Chebyshev(Mean, Sd) UCL	190
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	217.3
95% Approximate Gamma UCL	158.7		
95% Adjusted Gamma UCL	161.1		

Potential UCL to Use

Use 95% Student's-t UCL 157.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	0.258	Minimum of Log Data	-1.355
Maximum	10.5	Maximum of Log Data	2.351
Mean	1.461	Mean of log Data	-0.327
Median	0.617	SD of log Data	0.98
SD	2.865		
Coefficient of Variation	1.961		
Skewness	3.384		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.426	Shapiro Wilk Test Statistic	0.806
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.947	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.726
95% Adjusted-CLT UCL (Chen-1995)	3.685	95% Chebyshev (MVUE) UCL	2.557
95% Modified-t UCL (Johnson-1978)	3.081	97.5% Chebyshev (MVUE) UCL	3.185
		99% Chebyshev (MVUE) UCL	4.42

Gamma Distribution Test

k star (bias corrected)	0.682	Data Distribution	
Theta Star	2.142	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.461		
MLE of Standard Deviation	1.769		
nu star	16.37		
Approximate Chi Square Value (.05)	8.225	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	2.822
Adjusted Chi Square Value	7.36	95% Jackknife UCL	2.947
		95% Standard Bootstrap UCL	2.737
Anderson-Darling Test Statistic	1.771	95% Bootstrap-t UCL	13.86
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	9.84
Kolmogorov-Smirnov Test Statistic	0.329	95% Percentile Bootstrap UCL	3.092
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL	3.931
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.067
		97.5% Chebyshev(Mean, Sd) UCL	6.627
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.691
95% Approximate Gamma UCL	2.908		
95% Adjusted Gamma UCL	3.25		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.067

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

Minimum	0.0489	Log-transformed Statistics	
Maximum	6.5	Minimum of Log Data	-3.018
Mean	2.627	Maximum of Log Data	1.872
Median	2.723	Mean of log Data	0.346
SD	2.144	SD of log Data	1.512
Coefficient of Variation	0.816		
Skewness	0.705		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.874	Shapiro Wilk Test Statistic	0.827
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.738	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	26.46
95% Adjusted-CLT UCL (Chen-1995)	3.78	95% Chebyshev (MVUE) UCL	11.57
95% Modified-t UCL (Johnson-1978)	3.759	97.5% Chebyshev (MVUE) UCL	14.95
		99% Chebyshev (MVUE) UCL	21.59

Gamma Distribution Test

k star (bias corrected)	0.759	Data Distribution	
Theta Star	3.46	Data appear Normal at 5% Significance Level	
MLE of Mean	2.627		
MLE of Standard Deviation	3.015		
nu star	18.22		
Approximate Chi Square Value (.05)	9.553	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	3.645
Adjusted Chi Square Value	8.61	95% Jackknife UCL	3.738
		95% Standard Bootstrap UCL	3.607
Anderson-Darling Test Statistic	0.713	95% Bootstrap-t UCL	3.991
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	4.385
Kolmogorov-Smirnov Test Statistic	0.283	95% Percentile Bootstrap UCL	3.663
Kolmogorov-Smirnov 5% Critical Value	0.253	95% BCA Bootstrap UCL	3.722
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.325
		97.5% Chebyshev(Mean, Sd) UCL	6.492
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.785
95% Approximate Gamma UCL	5.011		
95% Adjusted Gamma UCL	5.56		

Potential UCL to Use

Use 95% Student's-t UCL 3.738

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

Minimum	12.3	Log-transformed Statistics	
Maximum	258	Minimum of Log Data	2.51
Mean	37.97	Maximum of Log Data	5.553
Median	15.4	Mean of log Data	3.053
SD	69.69	SD of log Data	0.853
Coefficient of Variation	1.835		
Skewness	3.395		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.402	Shapiro Wilk Test Statistic	0.614
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	74.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	60.33
95% Adjusted-CLT UCL (Chen-1995)	92.14	95% Chebyshev (MVUE) UCL	62.55
95% Modified-t UCL (Johnson-1978)	77.39	97.5% Chebyshev (MVUE) UCL	76.93
		99% Chebyshev (MVUE) UCL	105.2

Gamma Distribution Test

k star (bias corrected)	0.798	Data Distribution	
Theta Star	47.59	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	37.97		
MLE of Standard Deviation	42.51		
nu star	19.15		
Approximate Chi Square Value (.05)	10.23	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	71.06
Adjusted Chi Square Value	9.247	95% Jackknife UCL	74.1
		95% Standard Bootstrap UCL	70.55
Anderson-Darling Test Statistic	2.578	95% Bootstrap-t UCL	419.1
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	356.3
Kolmogorov-Smirnov Test Statistic	0.389	95% Percentile Bootstrap UCL	77.26
Kolmogorov-Smirnov 5% Critical Value	0.252	95% BCA Bootstrap UCL	96.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	125.7
		97.5% Chebyshev(Mean, Sd) UCL	163.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	238.1
95% Approximate Gamma UCL	71.1		
95% Adjusted Gamma UCL	78.64		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 125.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

cis-1,2-Dichloroethene

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.002	Minimum of Log Data	-6.215
Maximum	2400	Maximum of Log Data	7.783
Mean	241	Mean of log Data	0.81
Median	0.525	SD of log Data	3.792
SD	686.2		
Coefficient of Variation	2.848		
Skewness	3.356		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.407	Shapiro Wilk Test Statistic	0.872
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	596.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.7E+07
95% Adjusted-CLT UCL (Chen-1995)	771.9	95% Chebyshev (MVUE) UCL	1525
95% Modified-t UCL (Johnson-1978)	628.7	97.5% Chebyshev (MVUE) UCL	2055
		99% Chebyshev (MVUE) UCL	3094

Gamma Distribution Test

k star (bias corrected)	0.177	Data Distribution	
Theta Star	1358	Data appear Lognormal at 5% Significance Level	
MLE of Mean	241		
MLE of Standard Deviation	572.1		
nu star	4.258		
Approximate Chi Square Value (.05)	0.826	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	566.8
Adjusted Chi Square Value	0.626	95% Jackknife UCL	596.7
		95% Standard Bootstrap UCL	555.9
Anderson-Darling Test Statistic	1.482	95% Bootstrap-t UCL	2420
Anderson-Darling 5% Critical Value	0.878	95% Hall's Bootstrap UCL	2470
Kolmogorov-Smirnov Test Statistic	0.344	95% Percentile Bootstrap UCL	621.3
Kolmogorov-Smirnov 5% Critical Value	0.273	95% BCA Bootstrap UCL	820.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1104
		97.5% Chebyshev(Mean, Sd) UCL	1478
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2212
95% Approximate Gamma UCL	1242		
95% Adjusted Gamma UCL	1639		

Potential UCL to Use

Use 95% Hall's Bootstrap UCL 2470

Recommended UCL exceeds the maximum observation
 In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

Minimum	12.3	Log-transformed Statistics	
Maximum	231	Minimum of Log Data	2.51
Mean	34.35	Maximum of Log Data	5.442
Median	14.9	Mean of log Data	2.984
SD	62.2	SD of log Data	0.817
Coefficient of Variation	1.811		
Skewness	3.413		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.384	Shapiro Wilk Test Statistic	0.544
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.59	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	52.31
95% Adjusted-CLT UCL (Chen-1995)	82.78	95% Chebyshev (MVUE) UCL	55.49
95% Modified-t UCL (Johnson-1978)	69.54	97.5% Chebyshev (MVUE) UCL	67.97
		99% Chebyshev (MVUE) UCL	92.49

Gamma Distribution Test

k star (bias corrected)	0.835	Data Distribution	
Theta Star	41.13	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	34.35		
MLE of Standard Deviation	37.59		
nu star	20.04		
Approximate Chi Square Value (.05)	10.88	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	63.88
Adjusted Chi Square Value	9.865	95% Jackknife UCL	66.59
		95% Standard Bootstrap UCL	63.22
Anderson-Darling Test Statistic	2.972	95% Bootstrap-t UCL	977.5
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	386
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	69.23
Kolmogorov-Smirnov 5% Critical Value	0.252	95% BCA Bootstrap UCL	88.46
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	112.6
		97.5% Chebyshev(Mean, Sd) UCL	146.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	213
95% Approximate Gamma UCL	63.26		
95% Adjusted Gamma UCL	69.77		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 112.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	158	Minimum of Log Data	5.063
Maximum	902	Maximum of Log Data	6.805
Mean	608.2	Mean of log Data	6.311
Median	687.5	SD of log Data	0.521
SD	230.2		
Coefficient of Variation	0.378		
Skewness	-0.82		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	727.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	887.3
95% Adjusted-CLT UCL (Chen-1995)	700.7	95% Chebyshev (MVUE) UCL	1043
95% Modified-t UCL (Johnson-1978)	724.9	97.5% Chebyshev (MVUE) UCL	1224
		99% Chebyshev (MVUE) UCL	1581

Gamma Distribution Test

k star (bias corrected)	3.961	Data Distribution	
Theta Star	153.5	Data appear Normal at 5% Significance Level	
MLE of Mean	608.2		
MLE of Standard Deviation	305.6		
nu star	95.07		
Approximate Chi Square Value (.05)	73.58	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	717.5
Adjusted Chi Square Value	70.7	95% Jackknife UCL	727.6
		95% Standard Bootstrap UCL	713.2
Anderson-Darling Test Statistic	0.776	95% Bootstrap-t UCL	707
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	699.2
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	706.1
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	697.8
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	897.8
		97.5% Chebyshev(Mean, Sd) UCL	1023
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1269
95% Approximate Gamma UCL	785.9		
95% Adjusted Gamma UCL	817.9		

Potential UCL to Use

Use 95% Student's-t UCL 727.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0082	Minimum of Log Data	-4.804
Maximum	7.7	Maximum of Log Data	2.041
Mean	0.72	Mean of log Data	-3.098
Median	0.0258	SD of log Data	1.954
SD	2.207		
Coefficient of Variation	3.065		
Skewness	3.415		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.37	Shapiro Wilk Test Statistic	0.678
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.864	95% H-UCL	5.35
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.795
95% Adjusted-CLT UCL (Chen-1995)	2.439	97.5% Chebyshev (MVUE) UCL	1.045
95% Modified-t UCL (Johnson-1978)	1.969	99% Chebyshev (MVUE) UCL	1.536

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.247	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.913		
MLE of Mean	0.72		
MLE of Standard Deviation	1.448		
nu star	5.933		
Approximate Chi Square Value (.05)	1.606	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.768
Adjusted Chi Square Value	1.288	95% Jackknife UCL	1.864
		95% Standard Bootstrap UCL	1.743
Anderson-Darling Test Statistic	2.715	95% Bootstrap-t UCL	206.3
Anderson-Darling 5% Critical Value	0.842	95% Hall's Bootstrap UCL	51.92
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	1.943
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	2.638
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.497
		97.5% Chebyshev(Mean, Sd) UCL	4.699
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.06
95% Approximate Gamma UCL	2.66		
95% Adjusted Gamma UCL	3.316		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 7.06

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	9.69	Log-transformed Statistics	
Maximum	85.4	Minimum of Log Data	2.271
Mean	24.7	Maximum of Log Data	4.447
Median	19.2	Mean of log Data	3.042
SD	19.79	SD of log Data	0.53
Coefficient of Variation	0.801		
Skewness	3.053		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.581	Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	34.96	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	34.14
95% Adjusted-CLT UCL (Chen-1995)	39.48	95% Chebyshev (MVUE) UCL	40.08
95% Modified-t UCL (Johnson-1978)	35.8	97.5% Chebyshev (MVUE) UCL	47.13
		99% Chebyshev (MVUE) UCL	60.97

Gamma Distribution Test

k star (bias corrected)	2.448	Data Distribution	
Theta Star	10.09	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	24.7		
MLE of Standard Deviation	15.79		
nu star	58.75		
Approximate Chi Square Value (.05)	42.13	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	34.1
Adjusted Chi Square Value	39.99	95% Jackknife UCL	34.96
		95% Standard Bootstrap UCL	33.55
Anderson-Darling Test Statistic	1.098	95% Bootstrap-t UCL	55.26
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	73.05
Kolmogorov-Smirnov Test Statistic	0.281	95% Percentile Bootstrap UCL	35.62
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	41.02
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	49.6
		97.5% Chebyshev(Mean, Sd) UCL	60.38
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	81.54
95% Approximate Gamma UCL	34.44		
95% Adjusted Gamma UCL	36.29		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 49.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	0.017	Minimum of Log Data	-4.075
Maximum	35	Maximum of Log Data	3.555
Mean	3.424	Mean of log Data	-1.154
Median	0.239	SD of log Data	2.099
SD	9.986		
Coefficient of Variation	2.916		
Skewness	3.414		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.384	Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	8.601	95% H-UCL	75.49
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.207
95% Adjusted-CLT UCL (Chen-1995)	11.2	97.5% Chebyshev (MVUE) UCL	9.514
95% Modified-t UCL (Johnson-1978)	9.075	99% Chebyshev (MVUE) UCL	14.05

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.274	Data appear Lognormal at 5% Significance Level	
Theta Star	12.52		
MLE of Mean	3.424		
MLE of Standard Deviation	6.547		
nu star	6.565		
Approximate Chi Square Value (.05)	1.935	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	8.166
Adjusted Chi Square Value	1.576	95% Jackknife UCL	8.601
		95% Standard Bootstrap UCL	7.949
Anderson-Darling Test Statistic	1.475	95% Bootstrap-t UCL	129.9
Anderson-Darling 5% Critical Value	0.828	95% Hall's Bootstrap UCL	66.09
Kolmogorov-Smirnov Test Statistic	0.32	95% Percentile Bootstrap UCL	9.003
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	12.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.99
		97.5% Chebyshev(Mean, Sd) UCL	21.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32.11
95% Approximate Gamma UCL	11.62		
95% Adjusted Gamma UCL	14.26		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 32.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.08	Minimum of Log Data	-2.526
Maximum	73.9	Maximum of Log Data	4.303
Mean	11.03	Mean of log Data	-0.0102
Median	0.291	SD of log Data	2.294
SD	23.24		
Coefficient of Variation	2.107		
Skewness	2.341		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.555	Shapiro Wilk Test Statistic	0.792
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	23.07	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	666.7
95% Adjusted-CLT UCL (Chen-1995)	26.9	95% Chebyshev (MVUE) UCL	32.51
95% Modified-t UCL (Johnson-1978)	23.83	97.5% Chebyshev (MVUE) UCL	43.11
		99% Chebyshev (MVUE) UCL	63.93

Gamma Distribution Test

k star (bias corrected)	0.272	Data Distribution	
Theta Star	40.61	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.03		
MLE of Standard Deviation	21.16		
nu star	6.517		
Approximate Chi Square Value (.05)	1.909	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	22.06
Adjusted Chi Square Value	1.554	95% Jackknife UCL	23.07
		95% Standard Bootstrap UCL	21.43
Anderson-Darling Test Statistic	1.652	95% Bootstrap-t UCL	82.65
Anderson-Darling 5% Critical Value	0.829	95% Hall's Bootstrap UCL	92.86
Kolmogorov-Smirnov Test Statistic	0.394	95% Percentile Bootstrap UCL	22.4
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	27.71
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	40.27
		97.5% Chebyshev(Mean, Sd) UCL	52.92
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	77.77
95% Approximate Gamma UCL	37.64		
95% Adjusted Gamma UCL	46.26		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 77.77

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0053	Minimum of Log Data	-5.233
Maximum	0.6	Maximum of Log Data	-0.511
Mean	0.263	Mean of log Data	-1.761
Median	0.156	SD of log Data	1.253
SD	0.198		
Coefficient of Variation	0.752		
Skewness	0.727		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.857	Shapiro Wilk Test Statistic	0.764
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.365	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.359
95% Adjusted-CLT UCL (Chen-1995)	0.369	95% Chebyshev (MVUE) UCL	0.925
95% Modified-t UCL (Johnson-1978)	0.367	97.5% Chebyshev (MVUE) UCL	1.177
		99% Chebyshev (MVUE) UCL	1.674

Gamma Distribution Test

k star (bias corrected)	1.048	Data Distribution	
Theta Star	0.25	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	0.263		
MLE of Standard Deviation	0.256		
nu star	25.16		
Approximate Chi Square Value (.05)	14.73	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.356
Adjusted Chi Square Value	13.53	95% Jackknife UCL	0.365
		95% Standard Bootstrap UCL	0.352
Anderson-Darling Test Statistic	0.633	95% Bootstrap-t UCL	0.381
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	0.348
Kolmogorov-Smirnov Test Statistic	0.219	95% Percentile Bootstrap UCL	0.352
Kolmogorov-Smirnov 5% Critical Value	0.251	95% BCA Bootstrap UCL	0.361
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.511
		97.5% Chebyshev(Mean, Sd) UCL	0.619
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.83
95% Approximate Gamma UCL	0.448		
95% Adjusted Gamma UCL	0.488		

Potential UCL to Use

Use 95% Approximate Gamma UCL 0.448

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

trans-1,2-Dichloroethene

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

Minimum	0.002	Log-transformed Statistics	
Maximum	16	Minimum of Log Data	-6.215
Mean	3.03	Maximum of Log Data	2.773
Median	1	Mean of log Data	-0.209
SD	4.549	SD of log Data	2.355
Coefficient of Variation	1.501		
Skewness	2.44		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.68	Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.388	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	765.6
95% Adjusted-CLT UCL (Chen-1995)	6.178	95% Chebyshev (MVUE) UCL	29.85
95% Modified-t UCL (Johnson-1978)	5.543	97.5% Chebyshev (MVUE) UCL	39.63
		99% Chebyshev (MVUE) UCL	58.84

Gamma Distribution Test

k star (bias corrected)	0.419	Data Distribution	
Theta Star	7.234	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	3.03		
MLE of Standard Deviation	4.682		
nu star	10.05		
Approximate Chi Square Value (.05)	3.975	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.19
Adjusted Chi Square Value	3.412	95% Jackknife UCL	5.388
		95% Standard Bootstrap UCL	5.113
Anderson-Darling Test Statistic	0.208	95% Bootstrap-t UCL	8.172
Anderson-Darling 5% Critical Value	0.788	95% Hall's Bootstrap UCL	13.6
Kolmogorov-Smirnov Test Statistic	0.125	95% Percentile Bootstrap UCL	5.361
Kolmogorov-Smirnov 5% Critical Value	0.259	95% BCA Bootstrap UCL	6.103
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.754
		97.5% Chebyshev(Mean, Sd) UCL	11.23
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.1
95% Approximate Gamma UCL	7.664		
95% Adjusted Gamma UCL	8.929		

Potential UCL to Use

Use 95% Adjusted Gamma UCL 8.929

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

Minimum	0.001	Log-transformed Statistics	
Maximum	87	Minimum of Log Data	-6.908
Mean	12.64	Maximum of Log Data	4.466
Median	0.45	Mean of log Data	-0.686
SD	27.17	SD of log Data	3.336
Coefficient of Variation	2.15		
Skewness	2.387		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.55	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	26.72	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	392386
95% Adjusted-CLT UCL (Chen-1995)	31.31	95% Chebyshev (MVUE) UCL	130.2
95% Modified-t UCL (Johnson-1978)	27.62	97.5% Chebyshev (MVUE) UCL	175
		99% Chebyshev (MVUE) UCL	262.9

Gamma Distribution Test

k star (bias corrected)	0.224	Data Distribution	
Theta Star	56.48	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	12.64		
MLE of Standard Deviation	26.71		
nu star	5.37		
Approximate Chi Square Value (.05)	1.327	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	25.54
Adjusted Chi Square Value	1.048	95% Jackknife UCL	26.72
		95% Standard Bootstrap UCL	25.02
Anderson-Darling Test Statistic	0.732	95% Bootstrap-t UCL	97.83
Anderson-Darling 5% Critical Value	0.855	95% Hall's Bootstrap UCL	121.8
Kolmogorov-Smirnov Test Statistic	0.287	95% Percentile Bootstrap UCL	26.68
Kolmogorov-Smirnov 5% Critical Value	0.27	95% BCA Bootstrap UCL	31.93
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	46.83
		97.5% Chebyshev(Mean, Sd) UCL	61.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	90.68
95% Approximate Gamma UCL	51.14		
95% Adjusted Gamma UCL	64.78		

Potential UCL to Use

Use 95% Adjusted Gamma UCL 64.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	19.5	Log-transformed Statistics	
Maximum	42.1	Minimum of Log Data	2.97
Mean	28.45	Maximum of Log Data	3.74
Median	27.38	Mean of log Data	3.32
SD	7.149	SD of log Data	0.248
Coefficient of Variation	0.251		
Skewness	0.532		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.948	Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	32.16	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	32.83
95% Adjusted-CLT UCL (Chen-1995)	32.19	95% Chebyshev (MVUE) UCL	37.39
95% Modified-t UCL (Johnson-1978)	32.21	97.5% Chebyshev (MVUE) UCL	41.25
		99% Chebyshev (MVUE) UCL	48.85

Gamma Distribution Test

k star (bias corrected)	13.39	Data Distribution	
Theta Star	2.125	Data appear Normal at 5% Significance Level	
MLE of Mean	28.45		
MLE of Standard Deviation	7.775		
nu star	321.4		
Approximate Chi Square Value (.05)	280.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	31.85
Adjusted Chi Square Value	275.1	95% Jackknife UCL	32.16
		95% Standard Bootstrap UCL	31.75
Anderson-Darling Test Statistic	0.237	95% Bootstrap-t UCL	32.36
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	32.29
Kolmogorov-Smirnov Test Statistic	0.159	95% Percentile Bootstrap UCL	31.77
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	31.82
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	37.45
		97.5% Chebyshev(Mean, Sd) UCL	41.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	48.99
95% Approximate Gamma UCL	32.56		
95% Adjusted Gamma UCL	33.25		

Potential UCL to Use

Use 95% Student's-t UCL 32.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vinyl chloride

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.001	Minimum of Log Data	-6.908
Maximum	4.8	Maximum of Log Data	1.569
Mean	0.684	Mean of log Data	-2.192
Median	0.4	SD of log Data	2.755
SD	1.318		
Coefficient of Variation	1.927		
Skewness	3.255		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.488	Shapiro Wilk Test Statistic	0.825
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.368	95% H-UCL	1231
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.895
95% Adjusted-CLT UCL (Chen-1995)	1.692	97.5% Chebyshev (MVUE) UCL	11.89
95% Modified-t UCL (Johnson-1978)	1.427	99% Chebyshev (MVUE) UCL	17.76

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.332	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.063		
MLE of Mean	0.684		
MLE of Standard Deviation	1.188		
nu star	7.958		
Approximate Chi Square Value (.05)	2.711	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.31
Adjusted Chi Square Value	2.266	95% Jackknife UCL	1.368
		95% Standard Bootstrap UCL	1.297
Anderson-Darling Test Statistic	0.833	95% Bootstrap-t UCL	3.126
Anderson-Darling 5% Critical Value	0.811	95% Hall's Bootstrap UCL	4.252
Kolmogorov-Smirnov Test Statistic	0.271	95% Percentile Bootstrap UCL	1.427
Kolmogorov-Smirnov 5% Critical Value	0.263	95% BCA Bootstrap UCL	1.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.343
		97.5% Chebyshev(Mean, Sd) UCL	3.061
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.471
95% Approximate Gamma UCL	2.009		
95% Adjusted Gamma UCL	2.403		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 4.471

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.23	Minimum of Log Data -1.471
Maximum	0.784	Maximum of Log Data -0.243
Mean	0.299	Mean of log Data -1.28
Median	0.23	SD of log Data 0.35
SD	0.156	
Coefficient of Variation	0.523	
Skewness	3.191	

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.482	Shapiro Wilk Test Statistic 0.583
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.38	95% H-UCL 0.364
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.425
95% Adjusted-CLT UCL (Chen-1995)	0.418	97.5% Chebyshev (MVUE) UCL 0.482
95% Modified-t UCL (Johnson-1978)	0.387	99% Chebyshev (MVUE) UCL 0.593

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.287	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0566	
MLE of Mean	0.299	
MLE of Standard Deviation	0.13	
nu star	126.9	
Approximate Chi Square Value (.05)	101.9	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 0.373
Adjusted Chi Square Value	98.45	95% Jackknife UCL 0.38
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	2.225	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.366	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.496
		97.5% Chebyshev(Mean, Sd) UCL 0.581
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.748
95% Approximate Gamma UCL	0.373	
95% Adjusted Gamma UCL	0.385	

Potential UCL to Use

Use 95% Student's-t UCL	0.38
or 95% Modified-t UCL	0.387

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	2.09 Minimum of Log Data	0.737
Maximum	10.5 Maximum of Log Data	2.351
Mean	5.156 Mean of log Data	1.569
Median	5.156 SD of log Data	0.398
SD	2.083	
Coefficient of Variation	0.404	
Skewness	1.372	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.866 Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	6.236 95% H-UCL	6.626
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	7.786
95% Adjusted-CLT UCL (Chen-1995)	6.4 97.5% Chebyshev (MVUE) UCL	8.921
95% Modified-t UCL (Johnson-1978)	6.276 99% Chebyshev (MVUE) UCL	11.15

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	5.46 Data appear Normal at 5% Significance Level	
Theta Star	0.944	
MLE of Mean	5.156	
MLE of Standard Deviation	2.207	
nu star	131	
Approximate Chi Square Value (.05)	105.6 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	6.145
Adjusted Chi Square Value	102.1 95% Jackknife UCL	6.236
	95% Standard Bootstrap UCL	6.118
Anderson-Darling Test Statistic	0.503 95% Bootstrap-t UCL	6.596
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	11.22
Kolmogorov-Smirnov Test Statistic	0.216 95% Percentile Bootstrap UCL	6.104
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	6.396
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	7.777
	97.5% Chebyshev(Mean, Sd) UCL	8.911
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	11.14
95% Approximate Gamma UCL	6.399	
95% Adjusted Gamma UCL	6.617	

Potential UCL to Use Use 95% Student's-t UCL 6.236

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	97 Minimum of Log Data	4.575
Maximum	197 Maximum of Log Data	5.283
Mean	119.7 Mean of log Data	4.767
Median	119.7 SD of log Data	0.189
SD	26.56	
Coefficient of Variation	0.222	
Skewness	2.484	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.684 Shapiro Wilk Test Statistic	0.77
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	133.5 95% H-UCL	132.9
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	148
95% Adjusted-CLT UCL (Chen-1995)	138.2 97.5% Chebyshev (MVUE) UCL	160.4
95% Modified-t UCL (Johnson-1978)	134.4 99% Chebyshev (MVUE) UCL	184.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	20.84 Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.743	
MLE of Mean	119.7	
MLE of Standard Deviation	26.22	
nu star	500.3	
Approximate Chi Square Value (.05)	449.4 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	132.3
Adjusted Chi Square Value	442 95% Jackknife UCL	133.5
	95% Standard Bootstrap UCL	131.8
Anderson-Darling Test Statistic	1.14 95% Bootstrap-t UCL	144.6
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	186.8
Kolmogorov-Smirnov Test Statistic	0.301 95% Percentile Bootstrap UCL	133.3
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	139
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	153.1
	97.5% Chebyshev(Mean, Sd) UCL	167.6
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	196
95% Approximate Gamma UCL	133.2	
95% Adjusted Gamma UCL	135.5	

Potential UCL to Use

Use 95% Student's-t UCL 133.5
or 95% Modified-t UCL 134.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	0.0043 Minimum of Log Data	-5.442
Maximum	3.32 Maximum of Log Data	1.2
Mean	2.154 Mean of log Data	0.315
Median	2.162 SD of log Data	1.822
SD	0.803	
Coefficient of Variation	0.373	
Skewness	-1.667	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.801 Shapiro Wilk Test Statistic	0.414
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	2.571 95% H-UCL	88.86
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	19.06
95% Adjusted-CLT UCL (Chen-1995)	2.416 97.5% Chebyshev (MVUE) UCL	24.95
95% Modified-t UCL (Johnson-1978)	2.552 99% Chebyshev (MVUE) UCL	36.52

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.989 Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.177	
MLE of Mean	2.154	
MLE of Standard Deviation	2.166	
nu star	23.75	
Approximate Chi Square Value (.05)	13.66 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	2.536
Adjusted Chi Square Value	12.5 95% Jackknife UCL	2.571
	95% Standard Bootstrap UCL	2.519
Anderson-Darling Test Statistic	2.923 95% Bootstrap-t UCL	2.473
Anderson-Darling 5% Critical Value	0.751 95% Hall's Bootstrap UCL	2.471
Kolmogorov-Smirnov Test Statistic	0.452 95% Percentile Bootstrap UCL	2.483
Kolmogorov-Smirnov 5% Critical Value	0.251 95% BCA Bootstrap UCL	2.431
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	3.165
	97.5% Chebyshev(Mean, Sd) UCL	3.602
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	4.461
95% Approximate Gamma UCL	3.746	
95% Adjusted Gamma UCL	4.092	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 4.461

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	153	Minimum of Log Data	5.03
Maximum	881	Maximum of Log Data	6.781
Mean	404.6	Mean of log Data	5.883
Median	404.6	SD of log Data	0.52
SD	208.4		
Coefficient of Variation	0.515		
Skewness	1.068		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	512.7	95% H-UCL	576.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	677.7
95% Adjusted-CLT UCL (Chen-1995)	523.4	97.5% Chebyshev (MVUE) UCL	795.4
95% Modified-t UCL (Johnson-1978)	515.8	99% Chebyshev (MVUE) UCL	1027

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.292	Data appear Normal at 5% Significance Level	
Theta Star	122.9		
MLE of Mean	404.6		
MLE of Standard Deviation	223		
nu star	79.01		
Approximate Chi Square Value (.05)	59.53	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	503.6
Adjusted Chi Square Value	56.96	95% Jackknife UCL	512.7
		95% Standard Bootstrap UCL	500
Anderson-Darling Test Statistic	0.483	95% Bootstrap-t UCL	538.6
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	660.2
Kolmogorov-Smirnov Test Statistic	0.231	95% Percentile Bootstrap UCL	509.7
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	520.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	666.9
		97.5% Chebyshev(Mean, Sd) UCL	780.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1003
95% Approximate Gamma UCL	537		
95% Adjusted Gamma UCL	561.3		

Potential UCL to Use Use 95% Student's-t UCL 512.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	0.298	Minimum of Log Data -1.211
Maximum	29.7	Maximum of Log Data 3.391
Mean	13.51	Mean of log Data 2.328
Median	13.51	SD of log Data 1.143
SD	6.452	
Coefficient of Variation	0.477	
Skewness	0.779	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic 0.518
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	16.86	95% H-UCL 59.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 46.52
95% Adjusted-CLT UCL (Chen-1995)	17.02	97.5% Chebyshev (MVUE) UCL 58.77
95% Modified-t UCL (Johnson-1978)	16.93	99% Chebyshev (MVUE) UCL 82.83

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.529	Data do not follow a Discernable Distribution (0.05)
Theta Star	8.839	
MLE of Mean	13.51	
MLE of Standard Deviation	10.93	
nu star	36.69	
Approximate Chi Square Value (.05)	23.82	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 16.58
Adjusted Chi Square Value	22.25	95% Jackknife UCL 16.86
		95% Standard Bootstrap UCL 16.38
Anderson-Darling Test Statistic	2.11	95% Bootstrap-t UCL 17.15
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL 20.4
Kolmogorov-Smirnov Test Statistic	0.398	95% Percentile Bootstrap UCL 16.45
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL 16.94
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 21.63
		97.5% Chebyshev(Mean, Sd) UCL 25.14
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 32.04
95% Approximate Gamma UCL	20.81	
95% Adjusted Gamma UCL	22.28	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 21.63

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.017	Minimum of Log Data	-4.075
Maximum	0.365	Maximum of Log Data	-1.008
Mean	0.0757	Mean of log Data	-3.242
Median	0.017	SD of log Data	1.119
SD	0.106		
Coefficient of Variation	1.395		
Skewness	2.282		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.635	Shapiro Wilk Test Statistic	0.752
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.13	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.21
95% Adjusted-CLT UCL (Chen-1995)	0.147	95% Chebyshev (MVUE) UCL	0.171
95% Modified-t UCL (Johnson-1978)	0.134	97.5% Chebyshev (MVUE) UCL	0.215
		99% Chebyshev (MVUE) UCL	0.303

Gamma Distribution Test

k star (bias corrected)	0.721	Data Distribution	
Theta Star	0.105	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0757		
MLE of Standard Deviation	0.0891		
nu star	17.3		
Approximate Chi Square Value (.05)	8.889	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.126
Adjusted Chi Square Value	7.984	95% Jackknife UCL	0.13
		95% Standard Bootstrap UCL	0.124
Anderson-Darling Test Statistic	1.464	95% Bootstrap-t UCL	0.251
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	0.359
Kolmogorov-Smirnov Test Statistic	0.356	95% Percentile Bootstrap UCL	0.129
Kolmogorov-Smirnov 5% Critical Value	0.253	95% BCA Bootstrap UCL	0.144
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.208
		97.5% Chebyshev(Mean, Sd) UCL	0.266
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.379
95% Approximate Gamma UCL	0.147		
95% Adjusted Gamma UCL	0.164		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.208

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	0.307	Log-transformed Statistics	
Maximum	1.07	Minimum of Log Data	-1.181
Mean	0.638	Maximum of Log Data	0.0677
Median	0.625	Mean of log Data	-0.507
SD	0.221	SD of log Data	0.361
Coefficient of Variation	0.346		
Skewness	0.493		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.947	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.752	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.798
95% Adjusted-CLT UCL (Chen-1995)	0.752	95% Chebyshev (MVUE) UCL	0.934
95% Modified-t UCL (Johnson-1978)	0.754	97.5% Chebyshev (MVUE) UCL	1.061
		99% Chebyshev (MVUE) UCL	1.311

Gamma Distribution Test

k star (bias corrected)	6.704	Data Distribution	
Theta Star	0.0951	Data appear Normal at 5% Significance Level	
MLE of Mean	0.638		
MLE of Standard Deviation	0.246		
nu star	160.9		
Approximate Chi Square Value (.05)	132.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.743
Adjusted Chi Square Value	128.7	95% Jackknife UCL	0.752
		95% Standard Bootstrap UCL	0.74
Anderson-Darling Test Statistic	0.327	95% Bootstrap-t UCL	0.764
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	0.792
Kolmogorov-Smirnov Test Statistic	0.178	95% Percentile Bootstrap UCL	0.743
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	0.746
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.916
		97.5% Chebyshev(Mean, Sd) UCL	1.036
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.272
95% Approximate Gamma UCL	0.774		
95% Adjusted Gamma UCL	0.798		

Potential UCL to Use

		Use 95% Student's-t UCL	0.752
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0489	Minimum of Log Data	-3.018
Maximum	3.35	Maximum of Log Data	1.209
Mean	1.461	Mean of log Data	-0.253
Median	1.491	SD of log Data	1.432
SD	1.204		
Coefficient of Variation	0.824		
Skewness	0.133		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.887	Shapiro Wilk Test Statistic	0.865
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.085	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.97
95% Adjusted-CLT UCL (Chen-1995)	2.047	95% Chebyshev (MVUE) UCL	5.572
95% Modified-t UCL (Johnson-1978)	2.088	97.5% Chebyshev (MVUE) UCL	7.172
		99% Chebyshev (MVUE) UCL	10.31

Gamma Distribution Test

k star (bias corrected)	0.747	Data Distribution	
Theta Star	1.956	Data appear Normal at 5% Significance Level	
MLE of Mean	1.461		
MLE of Standard Deviation	1.691		
nu star	17.92		
Approximate Chi Square Value (.05)	9.336	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	2.033
Adjusted Chi Square Value	8.406	95% Jackknife UCL	2.085
		95% Standard Bootstrap UCL	2.016
Anderson-Darling Test Statistic	0.668	95% Bootstrap-t UCL	2.113
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	2.005
Kolmogorov-Smirnov Test Statistic	0.221	95% Percentile Bootstrap UCL	2.014
Kolmogorov-Smirnov 5% Critical Value	0.253	95% BCA Bootstrap UCL	2.034
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.976
		97.5% Chebyshev(Mean, Sd) UCL	3.632
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.919
95% Approximate Gamma UCL	2.805		
95% Adjusted Gamma UCL	3.116		

Potential UCL to Use Use 95% Student's-t UCL 2.085

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cesium-137 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	12.7	Minimum of Log Data	2.542
Maximum	137	Maximum of Log Data	4.92
Mean	26.97	Mean of log Data	2.978
Median	16	SD of log Data	0.657
SD	34.93		
Coefficient of Variation	1.295		
Skewness	3.366		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.434	Shapiro Wilk Test Statistic	0.65
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	45.08	95% H-UCL	38.82
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	44.34
95% Adjusted-CLT UCL (Chen-1995)	54.03	97.5% Chebyshev (MVUE) UCL	53.2
95% Modified-t UCL (Johnson-1978)	46.72	99% Chebyshev (MVUE) UCL	70.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.349	Data do not follow a Discernable Distribution (0.05)	
Theta Star	20		
MLE of Mean	26.97		
MLE of Standard Deviation	23.22		
nu star	32.37		
Approximate Chi Square Value (.05)	20.37	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	43.56
Adjusted Chi Square Value	18.93	95% Jackknife UCL	45.08
		95% Standard Bootstrap UCL	43.32
Anderson-Darling Test Statistic	2.191	95% Bootstrap-t UCL	157.9
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	109.1
Kolmogorov-Smirnov Test Statistic	0.321	95% Percentile Bootstrap UCL	46.68
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	57.43
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	70.93
		97.5% Chebyshev(Mean, Sd) UCL	89.95
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	127.3
95% Approximate Gamma UCL	42.87		
95% Adjusted Gamma UCL	46.14		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 70.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt-60 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	11.9	Minimum of Log Data	2.477
Maximum	63.8	Maximum of Log Data	4.156
Mean	20.85	Mean of log Data	2.922
Median	16.85	SD of log Data	0.435
SD	13.93		
Coefficient of Variation	0.668		
Skewness	3.118		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.556	Shapiro Wilk Test Statistic	0.766
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	28.07	95% H-UCL	26.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	31.57
95% Adjusted-CLT UCL (Chen-1995)	31.33	97.5% Chebyshev (MVUE) UCL	36.46
95% Modified-t UCL (Johnson-1978)	28.67	99% Chebyshev (MVUE) UCL	46.07

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.447	Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.048		
MLE of Mean	20.85		
MLE of Standard Deviation	11.23		
nu star	82.72		
Approximate Chi Square Value (.05)	62.76	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	27.46
Adjusted Chi Square Value	60.11	95% Jackknife UCL	28.07
		95% Standard Bootstrap UCL	27.26
Anderson-Darling Test Statistic	1.39	95% Bootstrap-t UCL	45.47
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	55.17
Kolmogorov-Smirnov Test Statistic	0.271	95% Percentile Bootstrap UCL	28.43
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	32.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38.38
		97.5% Chebyshev(Mean, Sd) UCL	45.96
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	60.87
95% Approximate Gamma UCL	27.48		
95% Adjusted Gamma UCL	28.69		

Potential UCL to Use

	Use 95% Student's-t UCL	28.07
	or 95% Modified-t UCL	28.67

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.017	Minimum of Log Data -4.075
Maximum	0.13	Maximum of Log Data -2.04
Mean	0.0375	Mean of log Data -3.669
Median	0.017	SD of log Data 0.794
SD	0.0436	
Coefficient of Variation	1.161	
Skewness	1.98	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.52	Shapiro Wilk Test Statistic 0.563
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.0601	95% H-UCL 0.0645
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.0693
95% Adjusted-CLT UCL (Chen-1995)	0.0659	97.5% Chebyshev (MVUE) UCL 0.0847
95% Modified-t UCL (Johnson-1978)	0.0613	99% Chebyshev (MVUE) UCL 0.115

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.132	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0332	
MLE of Mean	0.0375	
MLE of Standard Deviation	0.0353	
nu star	27.16	
Approximate Chi Square Value (.05)	16.28	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 0.0582
Adjusted Chi Square Value	15	95% Jackknife UCL 0.0601
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	2.779	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.0924
		97.5% Chebyshev(Mean, Sd) UCL 0.116
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.163
95% Approximate Gamma UCL	0.0627	
95% Adjusted Gamma UCL	0.068	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.0924

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thorium-230 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Trichloroethene

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.005	Minimum of Log Data	-5.298
Maximum	0.6	Maximum of Log Data	-0.511
Mean	0.396	Mean of log Data	-1.258
Median	0.4	SD of log Data	1.315
SD	0.173		
Coefficient of Variation	0.438		
Skewness	-1.056		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.9	Shapiro Wilk Test Statistic	0.544
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.485	95% H-UCL	2.722
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.687
95% Adjusted-CLT UCL (Chen-1995)	0.461	97.5% Chebyshev (MVUE) UCL	2.156
95% Modified-t UCL (Johnson-1978)	0.483	99% Chebyshev (MVUE) UCL	3.078

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.301	Data appear Normal at 5% Significance Level	
Theta Star	0.304		
MLE of Mean	0.396		
MLE of Standard Deviation	0.347		
nu star	31.23		
Approximate Chi Square Value (.05)	19.46	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.478
Adjusted Chi Square Value	18.05	95% Jackknife UCL	0.485
		95% Standard Bootstrap UCL	0.475
Anderson-Darling Test Statistic	1.668	95% Bootstrap-t UCL	0.471
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	0.463
Kolmogorov-Smirnov Test Statistic	0.353	95% Percentile Bootstrap UCL	0.471
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	0.458
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.613
		97.5% Chebyshev(Mean, Sd) UCL	0.708
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.893
95% Approximate Gamma UCL	0.635		
95% Adjusted Gamma UCL	0.684		

Potential UCL to Use Use 95% Student's-t UCL 0.485

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	0.253	Minimum of Log Data	-1.374
Maximum	40.2	Maximum of Log Data	3.694
Mean	23.65	Mean of log Data	2.839
Median	23.78	SD of log Data	1.347
SD	9.752		
Coefficient of Variation	0.412		
Skewness	-0.824		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.906	Shapiro Wilk Test Statistic	0.492
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	28.71	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	181.2
95% Adjusted-CLT UCL (Chen-1995)	27.57	95% Chebyshev (MVUE) UCL	106.7
95% Modified-t UCL (Johnson-1978)	28.59	97.5% Chebyshev (MVUE) UCL	136.7
		99% Chebyshev (MVUE) UCL	195.6

Gamma Distribution Test

k star (bias corrected)	1.321	Data Distribution	
Theta Star	17.9	Data appear Normal at 5% Significance Level	
MLE of Mean	23.65		
MLE of Standard Deviation	20.58		
nu star	31.71		
Approximate Chi Square Value (.05)	19.84	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	28.28
Adjusted Chi Square Value	18.42	95% Jackknife UCL	28.71
		95% Standard Bootstrap UCL	28.09
Anderson-Darling Test Statistic	2.014	95% Bootstrap-t UCL	28.17
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	28.31
Kolmogorov-Smirnov Test Statistic	0.405	95% Percentile Bootstrap UCL	27.88
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	27.45
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	35.92
		97.5% Chebyshev(Mean, Sd) UCL	41.23
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	51.66
95% Approximate Gamma UCL	37.8		
95% Adjusted Gamma UCL	40.71		

Potential UCL to Use Use 95% Student's-t UCL 28.71

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-05.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	8
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	4290	Minimum of Log Data	8.364
Maximum	12000	Maximum of Log Data	9.393
Mean	7927	Mean of log Data	8.945
Median	7927	SD of log Data	0.28
SD	2076		
Coefficient of Variation	0.262		
Skewness	0.261		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	9214	95% H-UCL	9712
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11186
95% Adjusted-CLT UCL (Chen-1995)	9129	97.5% Chebyshev (MVUE) UCL	12590
95% Modified-t UCL (Johnson-1978)	9224	99% Chebyshev (MVUE) UCL	15347

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	10.34	Data appear Normal at 5% Significance Level	
Theta Star	766.8		
MLE of Mean	7927		
MLE of Standard Deviation	2466		
nu star	186.1		
Approximate Chi Square Value (.05)	155.5	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	9065
Adjusted Chi Square Value	149.6	95% Jackknife UCL	9214
		95% Standard Bootstrap UCL	9003
Anderson-Darling Test Statistic	0.489	95% Bootstrap-t UCL	9232
Anderson-Darling 5% Critical Value	0.721	95% Hall's Bootstrap UCL	9559
Kolmogorov-Smirnov Test Statistic	0.215	95% Percentile Bootstrap UCL	8993
Kolmogorov-Smirnov 5% Critical Value	0.279	95% BCA Bootstrap UCL	9007
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10943
		97.5% Chebyshev(Mean, Sd) UCL	12248
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14811
95% Approximate Gamma UCL	9485		
95% Adjusted Gamma UCL	9858		

Potential UCL to Use

	Use 95% Student's-t UCL	9214
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 8

Raw Statistics	Log-transformed Statistics	
Minimum	3.17	Minimum of Log Data 1.154
Maximum	16.7	Maximum of Log Data 2.815
Mean	6.613	Mean of log Data 1.758
Median	6.05	SD of log Data 0.511
SD	4.143	
Coefficient of Variation	0.627	
Skewness	2.112	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.761	Shapiro Wilk Test Statistic 0.924
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value 0.829
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.181	Assuming Lognormal Distribution	95% H-UCL 9.918
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.41
95% Adjusted-CLT UCL (Chen-1995)	9.923	97.5% Chebyshev (MVUE) UCL	13.53
95% Modified-t UCL (Johnson-1978)	9.343	99% Chebyshev (MVUE) UCL	17.7

Gamma Distribution Test

k star (bias corrected)	2.732	Data Distribution	Data appear Gamma Distributed at 5% Significance Level
Theta Star	2.42		
MLE of Mean	6.613		
MLE of Standard Deviation	4.001		
nu star	49.18		
Approximate Chi Square Value (.05)	34.08	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	8.885
Adjusted Chi Square Value	31.45	95% Jackknife UCL	9.181
		95% Standard Bootstrap UCL	8.764
Anderson-Darling Test Statistic	0.467	95% Bootstrap-t UCL	11.86
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	18.83
Kolmogorov-Smirnov Test Statistic	0.211	95% Percentile Bootstrap UCL	8.967
Kolmogorov-Smirnov 5% Critical Value	0.28	95% BCA Bootstrap UCL	9.595
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.63
		97.5% Chebyshev(Mean, Sd) UCL	15.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.35
95% Approximate Gamma UCL	9.543		
95% Adjusted Gamma UCL	10.34		

Potential UCL to Use Use 95% Approximate Gamma UCL 9.543

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 8

Raw Statistics	Log-transformed Statistics	
Minimum	37.4	Minimum of Log Data 3.622
Maximum	215	Maximum of Log Data 5.371
Mean	118.1	Mean of log Data 4.685
Median	118.1	SD of log Data 0.475
SD	47.39	
Coefficient of Variation	0.401	
Skewness	0.509	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.891	Shapiro Wilk Test Statistic 0.842
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value 0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	147.4	Assuming Lognormal Distribution	95% H-UCL	175.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		203.4
95% Adjusted-CLT UCL (Chen-1995)	146.9	97.5% Chebyshev (MVUE) UCL		239.6
95% Modified-t UCL (Johnson-1978)	147.9	99% Chebyshev (MVUE) UCL		310.7

Gamma Distribution Test

k star (bias corrected)	4.048	Data Distribution	Data appear Normal at 5% Significance Level
Theta Star	29.17		
MLE of Mean	118.1		
MLE of Standard Deviation	58.69		
nu star	72.86		
Approximate Chi Square Value (.05)	54.2	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	144.1
Adjusted Chi Square Value	50.83	95% Jackknife UCL	147.4
		95% Standard Bootstrap UCL	142.3
Anderson-Darling Test Statistic	0.685	95% Bootstrap-t UCL	148.6
Anderson-Darling 5% Critical Value	0.723	95% Hall's Bootstrap UCL	162.5
Kolmogorov-Smirnov Test Statistic	0.29	95% Percentile Bootstrap UCL	144.6
Kolmogorov-Smirnov 5% Critical Value	0.28	95% BCA Bootstrap UCL	144.2
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	186.9
		97.5% Chebyshev(Mean, Sd) UCL	216.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	275.2
95% Approximate Gamma UCL	158.7		
95% Adjusted Gamma UCL	169.3		

Potential UCL to Use Use 95% Student's-t UCL 147.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.332	Minimum of Log Data	-1.1
Maximum	8.3	Maximum of Log Data	2.116
Mean	1.594	Mean of log Data	-0.18
Median	0.498	SD of log Data	1.037
SD	2.563		
Coefficient of Variation	1.608		
Skewness	2.795		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.542	Shapiro Wilk Test Statistic	0.823
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.183	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4.844
95% Adjusted-CLT UCL (Chen-1995)	3.85	95% Chebyshev (MVUE) UCL	3.39
95% Modified-t UCL (Johnson-1978)	3.316	97.5% Chebyshev (MVUE) UCL	4.284
		99% Chebyshev (MVUE) UCL	6.041

Gamma Distribution Test

k star (bias corrected)	0.679	Data Distribution	
Theta Star	2.347	Data Follow Appr. Gamma Distribution at 5% Significance L	
MLE of Mean	1.594		
MLE of Standard Deviation	1.934		
nu star	12.23		
Approximate Chi Square Value (.05)	5.378	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	3
Adjusted Chi Square Value	4.459	95% Jackknife UCL	3.183
		95% Standard Bootstrap UCL	2.909
Anderson-Darling Test Statistic	1.101	95% Bootstrap-t UCL	8.161
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	8
Kolmogorov-Smirnov Test Statistic	0.284	95% Percentile Bootstrap UCL	3.186
Kolmogorov-Smirnov 5% Critical Value	0.288	95% BCA Bootstrap UCL	3.943
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.318
		97.5% Chebyshev(Mean, Sd) UCL	6.93
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.1
95% Approximate Gamma UCL	3.625		
95% Adjusted Gamma UCL	4.373		

Potential UCL to Use		Use 95% Approximate Gamma UCL	3.625
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 8

Raw Statistics	Log-transformed Statistics	
Minimum	1.48 Minimum of Log Data	0.392
Maximum	2.97 Maximum of Log Data	1.089
Mean	2.067 Mean of log Data	0.706
Median	2.067 SD of log Data	0.215
SD	0.448	
Coefficient of Variation	0.217	
Skewness	0.671	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.919 Shapiro Wilk Test Statistic	0.93
Shapiro Wilk Critical Value	0.829 Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.345 95% H-UCL	2.398
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	2.714
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	2.994
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	3.544

Gamma Distribution Test

k star (bias corrected)	16.43 Data appear Normal at 5% Significance Level	
Theta Star	0.126	
MLE of Mean	2.067	
MLE of Standard Deviation	0.51	
nu star	295.7	
Approximate Chi Square Value (.05)	256.8 Nonparametric Statistics	
Adjusted Level of Significance	0.023 95% CLT UCL	2.313
Adjusted Chi Square Value	249.2 95% Jackknife UCL	2.345
	95% Standard Bootstrap UCL	2.304
Anderson-Darling Test Statistic	0.377 95% Bootstrap-t UCL	2.358
Anderson-Darling 5% Critical Value	0.721 95% Hall's Bootstrap UCL	2.488
Kolmogorov-Smirnov Test Statistic	0.191 95% Percentile Bootstrap UCL	2.312
Kolmogorov-Smirnov 5% Critical Value	0.279 95% BCA Bootstrap UCL	2.367
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	2.718
	97.5% Chebyshev(Mean, Sd) UCL	3
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	3.554
95% Approximate Gamma UCL	2.38	
95% Adjusted Gamma UCL	2.453	

Potential UCL to Use Use 95% Student's-t UCL 2.345

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 8

Raw Statistics

Minimum	3.4	Minimum of Log Data	1.224
Maximum	14.3	Maximum of Log Data	2.66
Mean	6.673	Mean of log Data	1.795
Median	6.06	SD of log Data	0.463
SD	3.504		
Coefficient of Variation	0.525		
Skewness	1.521		

Log-transformed Statistics

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.845	95% H-UCL	9.606
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.13
95% Adjusted-CLT UCL (Chen-1995)	9.227	97.5% Chebyshev (MVUE) UCL	13.08
95% Modified-t UCL (Johnson-1978)	8.943	99% Chebyshev (MVUE) UCL	16.92

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	3.42	Data appear Normal at 5% Significance Level	
Theta Star	1.951		
MLE of Mean	6.673		
MLE of Standard Deviation	3.608		
nu star	61.56		
Approximate Chi Square Value (.05)	44.51	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	8.594
Adjusted Chi Square Value	41.47	95% Jackknife UCL	8.845
		95% Standard Bootstrap UCL	8.476
Anderson-Darling Test Statistic	0.439	95% Bootstrap-t UCL	10.98
Anderson-Darling 5% Critical Value	0.723	95% Hall's Bootstrap UCL	19.36
Kolmogorov-Smirnov Test Statistic	0.218	95% Percentile Bootstrap UCL	8.68
Kolmogorov-Smirnov 5% Critical Value	0.28	95% BCA Bootstrap UCL	8.943
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.76
		97.5% Chebyshev(Mean, Sd) UCL	13.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.29
95% Approximate Gamma UCL	9.228		
95% Adjusted Gamma UCL	9.905		

Data Distribution

Potential UCL to Use Use 95% Student's-t UCL 8.845

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 8

Raw Statistics	Log-transformed Statistics	
Minimum	321	Minimum of Log Data 5.771
Maximum	2160	Maximum of Log Data 7.678
Mean	664	Mean of log Data 6.28
Median	384	SD of log Data 0.628
SD	587.3	
Coefficient of Variation	0.884	
Skewness	2.527	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.628	Shapiro Wilk Test Statistic 0.798
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value 0.829
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1028	Assuming Lognormal Distribution	95% H-UCL	1131
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		1225
95% Adjusted-CLT UCL (Chen-1995)	1162	97.5% Chebyshev (MVUE) UCL		1481
95% Modified-t UCL (Johnson-1978)	1055	99% Chebyshev (MVUE) UCL		1983

Gamma Distribution Test

k star (bias corrected)	1.704	Data Distribution	Data Follow Appr. Gamma Distribution at 5% Significance L
Theta Star	389.8		
MLE of Mean	664		
MLE of Standard Deviation	508.7		
nu star	30.66		
Approximate Chi Square Value (.05)	19.02	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	986
Adjusted Chi Square Value	17.11	95% Jackknife UCL	1028
		95% Standard Bootstrap UCL	961.5
Anderson-Darling Test Statistic	0.976	95% Bootstrap-t UCL	1686
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	2137
Kolmogorov-Smirnov Test Statistic	0.268	95% Percentile Bootstrap UCL	1020
Kolmogorov-Smirnov 5% Critical Value	0.282	95% BCA Bootstrap UCL	1183
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1517
		97.5% Chebyshev(Mean, Sd) UCL	1886
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2612
95% Approximate Gamma UCL	1071		
95% Adjusted Gamma UCL	1190		

Potential UCL to Use Use 95% Approximate Gamma UCL 1071

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 8

Raw Statistics	Log-transformed Statistics	
Minimum	6.79	Minimum of Log Data 1.915
Maximum	40.7	Maximum of Log Data 3.706
Mean	18.34	Mean of log Data 2.771
Median	18.34	SD of log Data 0.569
SD	10.25	
Coefficient of Variation	0.559	
Skewness	1.229	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.896	Shapiro Wilk Test Statistic 0.947
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value 0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	24.7	Assuming Lognormal Distribution	95% H-UCL	30.23
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		33.92
95% Adjusted-CLT UCL (Chen-1995)	25.46	97.5% Chebyshev (MVUE) UCL		40.63
95% Modified-t UCL (Johnson-1978)	24.93	99% Chebyshev (MVUE) UCL		53.82

Gamma Distribution Test

k star (bias corrected)	2.594	Data Distribution	Data appear Normal at 5% Significance Level
Theta Star	7.073		
MLE of Mean	18.34		
MLE of Standard Deviation	11.39		
nu star	46.68		
Approximate Chi Square Value (.05)	32.01	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	23.97
Adjusted Chi Square Value	29.46	95% Jackknife UCL	24.7
		95% Standard Bootstrap UCL	23.62
Anderson-Darling Test Statistic	0.269	95% Bootstrap-t UCL	27.42
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	51.55
Kolmogorov-Smirnov Test Statistic	0.139	95% Percentile Bootstrap UCL	23.66
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL	24.97
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	33.24
		97.5% Chebyshev(Mean, Sd) UCL	39.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	52.35
95% Approximate Gamma UCL	26.76		
95% Adjusted Gamma UCL	29.07		

Potential UCL to Use Use 95% Student's-t UCL 24.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.017	Minimum of Log Data	-4.08
Maximum	0.27	Maximum of Log Data	-1.31
Mean	0.074	Mean of log Data	-3.17
Median	0.017	SD of log Data	1.123
SD	0.086		
Coefficient of Variation	1.154		
Skewness	1.713		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.736	Shapiro Wilk Test Statistic	0.771
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.128	95% H-UCL	0.319
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.193
95% Adjusted-CLT UCL (Chen-1995)	0.139	97.5% Chebyshev (MVUE) UCL	0.245
95% Modified-t UCL (Johnson-1978)	0.13	99% Chebyshev (MVUE) UCL	0.348

Gamma Distribution Test

k star (bias corrected)	0.748	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.099		
MLE of Mean	0.074		
MLE of Standard Deviation	0.086		
nu star	13.46		
Approximate Chi Square Value (.05)	6.205	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	0.121
Adjusted Chi Square Value	5.203	95% Jackknife UCL	0.128
		95% Standard Bootstrap UCL	0.118

Anderson-Darling Test Statistic	0.991	95% Bootstrap-t UCL	0.166
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	0.144
Kolmogorov-Smirnov Test Statistic	0.354	95% Percentile Bootstrap UCL	0.124
Kolmogorov-Smirnov 5% Critical Value	0.287	95% BCA Bootstrap UCL	0.132
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.199
		97.5% Chebyshev(Mean, Sd) UCL	0.253
		99% Chebyshev(Mean, Sd) UCL	0.359
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.161		
95% Adjusted Gamma UCL	0.192		

Potential UCL to Use 0

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.088	Minimum of Log Data	-2.44
Maximum	0.33	Maximum of Log Data	-1.11
Mean	0.262	Mean of log Data	-1.44
Median	0.33	SD of log Data	0.54
SD	0.1		
Coefficient of Variation	0.382		
Skewness	-1.31		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.703	Shapiro Wilk Test Statistic	0.66
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.324	95% H-UCL	0.425
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.483
95% Adjusted-CLT UCL (Chen-1995)	0.302	97.5% Chebyshev (MVUE) UCL	0.576
95% Modified-t UCL (Johnson-1978)	0.322	99% Chebyshev (MVUE) UCL	0.758

Gamma Distribution Test

k star (bias corrected)	3.407	Data Distribution	
Theta Star	0.077	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.262		
MLE of Standard Deviation	0.142		
nu star	61.32		
Approximate Chi Square Value (.05)	44.31	Nonparametric Statistics	
Adjusted Level of Significance	0.023	95% CLT UCL	0.317
Adjusted Chi Square Value	41.28	95% Jackknife UCL	0.324

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.472	95% Standard Bootstrap UCL	0.314
Anderson-Darling 5% Critical Value	0.723	95% Bootstrap-t UCL	0.309
Kolmogorov-Smirnov Test Statistic	0.337	95% Hall's Bootstrap UCL	0.3
Kolmogorov-Smirnov 5% Critical Value	0.28	95% Percentile Bootstrap UCL	0.307
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	0.307
		95% Chebyshev(Mean, Sd) UCL	0.408
		97.5% Chebyshev(Mean, Sd) UCL	0.471
		99% Chebyshev(Mean, Sd) UCL	0.595

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.363
95% Adjusted Gamma UCL	0.39

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	0.408
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Beryllium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	7
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.467	Minimum of Log Data -0.761
Maximum	7.8	Maximum of Log Data 2.054
Mean	1.755	Mean of log Data 0.25
Median	1.755	SD of log Data 0.773
SD	1.837	
Coefficient of Variation	1.047	
Skewness	3.07	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.549	Shapiro Wilk Test Statistic 0.799
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value 0.874
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	2.624	95% H-UCL 2.92
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 3.295
95% Adjusted-CLT UCL (Chen-1995)	2.993	97.5% Chebyshev (MVUE) UCL 3.99
95% Modified-t UCL (Johnson-1978)	2.691	99% Chebyshev (MVUE) UCL 5.357

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.423	Data do not follow a Discernable Distribution (0.05)
Theta Star	1.233	
MLE of Mean	1.755	
MLE of Standard Deviation	1.471	
nu star	39.85	
Approximate Chi Square Value (.05)	26.39	Nonparametric Statistics
Adjusted Level of Significance	0.0312	95% CLT UCL 2.562
Adjusted Chi Square Value	24.94	95% Jackknife UCL 2.624
		95% Standard Bootstrap UCL 2.532
Anderson-Darling Test Statistic	1.528	95% Bootstrap-t UCL 3.795
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL 5.839
Kolmogorov-Smirnov Test Statistic	0.328	95% Percentile Bootstrap UCL 2.618
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL 3.138
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 3.894
		97.5% Chebyshev(Mean, Sd) UCL 4.82
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 6.639
95% Approximate Gamma UCL	2.65	
95% Adjusted Gamma UCL	2.803	
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL 3.894

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 7

Raw Statistics	Log-transformed Statistics	
Minimum	0.0489	Minimum of Log Data -3.018
Maximum	1.88	Maximum of Log Data 0.631
Mean	1.068	Mean of log Data -0.122
Median	1.068	SD of log Data 0.873
SD	0.442	
Coefficient of Variation	0.414	
Skewness	-0.0736	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.793	Shapiro Wilk Test Statistic 0.541
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value 0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.277	95% H-UCL 2.424
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 2.613
95% Adjusted-CLT UCL (Chen-1995)	1.26	97.5% Chebyshev (MVUE) UCL 3.202
95% Modified-t UCL (Johnson-1978)	1.277	99% Chebyshev (MVUE) UCL 4.359

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.265	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.472	
MLE of Mean	1.068	
MLE of Standard Deviation	0.71	
nu star	63.41	
Approximate Chi Square Value (.05)	46.09	Nonparametric Statistics
Adjusted Level of Significance	0.0312	95% CLT UCL 1.262
Adjusted Chi Square Value	44.14	95% Jackknife UCL 1.277
		95% Standard Bootstrap UCL 1.251
Anderson-Darling Test Statistic	2.174	95% Bootstrap-t UCL 1.288
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL 1.371
Kolmogorov-Smirnov Test Statistic	0.365	95% Percentile Bootstrap UCL 1.254
Kolmogorov-Smirnov 5% Critical Value	0.231	95% BCA Bootstrap UCL 1.255
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.583
		97.5% Chebyshev(Mean, Sd) UCL 1.806
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2.244
95% Approximate Gamma UCL	1.469	
95% Adjusted Gamma UCL	1.534	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.583

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics	Log-transformed Statistics		
Minimum	0.125	Minimum of Log Data	-2.079
Maximum	0.753	Maximum of Log Data	-0.284
Mean	0.527	Mean of log Data	-0.698
Median	0.527	SD of log Data	0.415
SD	0.137		
Coefficient of Variation	0.26		
Skewness	-1.676		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.619	Shapiro Wilk Test Statistic	0.483
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	0.591	95% H-UCL	0.682
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.804
95% Adjusted-CLT UCL (Chen-1995)	0.569	97.5% Chebyshev (MVUE) UCL	0.919
95% Modified-t UCL (Johnson-1978)	0.589	99% Chebyshev (MVUE) UCL	1.144

Gamma Distribution Test	Data Distribution		
k star (bias corrected)	7.108	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0741		
MLE of Mean	0.527		
MLE of Standard Deviation	0.198		
nu star	199		
Approximate Chi Square Value (.05)	167.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.587
Adjusted Chi Square Value	163.5	95% Jackknife UCL	0.591
		95% Standard Bootstrap UCL	0.583
Anderson-Darling Test Statistic	3.116	95% Bootstrap-t UCL	0.58
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	0.579
Kolmogorov-Smirnov Test Statistic	0.473	95% Percentile Bootstrap UCL	0.577
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	0.572
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.686
		97.5% Chebyshev(Mean, Sd) UCL	0.755
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.89
95% Approximate Gamma UCL	0.626		
95% Adjusted Gamma UCL	0.641		

Potential UCL to Use	Use 95% Student's-t UCL	0.591
	or 95% Modified-t UCL	0.589

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	4.8	Minimum of Log Data	1.569
Maximum	16.8	Maximum of Log Data	2.821
Mean	11.63	Mean of log Data	2.425
Median	11.63	SD of log Data	0.272
SD	2.499		
Coefficient of Variation	0.215		
Skewness	-0.977		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.73	Shapiro Wilk Test Statistic	0.625
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	12.82	95% H-UCL	13.51
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	15.43
95% Adjusted-CLT UCL (Chen-1995)	12.55	97.5% Chebyshev (MVUE) UCL	17.05
95% Modified-t UCL (Johnson-1978)	12.79	99% Chebyshev (MVUE) UCL	20.22

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	13.88	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.838		
MLE of Mean	11.63		
MLE of Standard Deviation	3.123		
nu star	388.6		
Approximate Chi Square Value (.05)	343.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	12.73
Adjusted Chi Square Value	338.3	95% Jackknife UCL	12.82
		95% Standard Bootstrap UCL	12.69
Anderson-Darling Test Statistic	2.224	95% Bootstrap-t UCL	12.61
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	12.8
Kolmogorov-Smirnov Test Statistic	0.384	95% Percentile Bootstrap UCL	12.63
Kolmogorov-Smirnov 5% Critical Value	0.228	95% BCA Bootstrap UCL	12.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.55
		97.5% Chebyshev(Mean, Sd) UCL	15.81
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.28
95% Approximate Gamma UCL	13.15		
95% Adjusted Gamma UCL	13.36		

Potential UCL to Use

Use 95% Student's-t UCL	12.82
or 95% Modified-t UCL	12.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 4

Raw Statistics		Log-transformed Statistics	
Minimum	0.00148	Minimum of Log Data	-6.516
Maximum	0.663	Maximum of Log Data	-0.411
Mean	0.23	Mean of log Data	-1.907
Median	0.23	SD of log Data	1.482
SD	0.147		
Coefficient of Variation	0.638		
Skewness	1.709		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.613	Shapiro Wilk Test Statistic	0.539
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.3	95% H-UCL	2.002
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.142
95% Adjusted-CLT UCL (Chen-1995)	0.314	97.5% Chebyshev (MVUE) UCL	1.468
95% Modified-t UCL (Johnson-1978)	0.303	99% Chebyshev (MVUE) UCL	2.109

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.053	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.219		
MLE of Mean	0.23		
MLE of Standard Deviation	0.225		
nu star	29.48		
Approximate Chi Square Value (.05)	18.08	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.295
Adjusted Chi Square Value	16.91	95% Jackknife UCL	0.3
		95% Standard Bootstrap UCL	0.294
Anderson-Darling Test Statistic	2.958	95% Bootstrap-t UCL	0.32
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	0.669
Kolmogorov-Smirnov Test Statistic	0.474	95% Percentile Bootstrap UCL	0.292
Kolmogorov-Smirnov 5% Critical Value	0.234	95% BCA Bootstrap UCL	0.309
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.402
		97.5% Chebyshev(Mean, Sd) UCL	0.476
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.621
95% Approximate Gamma UCL	0.376		
95% Adjusted Gamma UCL	0.402		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.402

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
PCB, Total

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	0.2	Maximum of Log Data	-1.609
Mean	0.158	Mean of log Data	-1.873
Median	0.13	SD of log Data	0.238
SD	0.038		
Coefficient of Variation	0.241		
Skewness	0.29		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.7	Shapiro Wilk Test Statistic	0.714
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.176	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.179
95% Adjusted-CLT UCL (Chen-1995)	0.175	95% Chebyshev (MVUE) UCL	0.202
95% Modified-t UCL (Johnson-1978)	0.176	97.5% Chebyshev (MVUE) UCL	0.221
		99% Chebyshev (MVUE) UCL	0.258

Gamma Distribution Test

k star (bias corrected)	14.95	Data Distribution	
Theta Star	0.0106	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.158		
MLE of Standard Deviation	0.0408		
nu star	418.6		
Approximate Chi Square Value (.05)	372.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.174
Adjusted Chi Square Value	366.4	95% Jackknife UCL	0.176
		95% Standard Bootstrap UCL	0.174
Anderson-Darling Test Statistic	2.023	95% Bootstrap-t UCL	0.177
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	0.172
Kolmogorov-Smirnov Test Statistic	0.342	95% Percentile Bootstrap UCL	0.174
Kolmogorov-Smirnov 5% Critical Value	0.228	95% BCA Bootstrap UCL	0.174
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.202
		97.5% Chebyshev(Mean, Sd) UCL	0.221
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.259
95% Approximate Gamma UCL	0.177		
95% Adjusted Gamma UCL	0.18		

Potential UCL to Use
Use 95% Student's-t UCL 0.176
or 95% Modified-t UCL 0.176

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Plutonium-239/240

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics		Log-transformed Statistics	
Minimum	0.241	Minimum of Log Data	-1.423
Maximum	9.05	Maximum of Log Data	2.203
Mean	4.08	Mean of log Data	1.238
Median	4.08	SD of log Data	0.801
SD	1.77		
Coefficient of Variation	0.434		
Skewness	1.048		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.614	Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	4.918	95% H-UCL	8.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.201
95% Adjusted-CLT UCL (Chen-1995)	5	97.5% Chebyshev (MVUE) UCL	11.18
95% Modified-t UCL (Johnson-1978)	4.94	99% Chebyshev (MVUE) UCL	15.08

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.504	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.629		
MLE of Mean	4.08		
MLE of Standard Deviation	2.578		
nu star	70.12		
Approximate Chi Square Value (.05)	51.84	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	4.858
Adjusted Chi Square Value	49.76	95% Jackknife UCL	4.918
		95% Standard Bootstrap UCL	4.847
Anderson-Darling Test Statistic	3.122	95% Bootstrap-t UCL	4.971
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	6.054
Kolmogorov-Smirnov Test Statistic	0.432	95% Percentile Bootstrap UCL	4.871
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	4.984
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.142
		97.5% Chebyshev(Mean, Sd) UCL	7.034
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.786
95% Approximate Gamma UCL	5.519		
95% Adjusted Gamma UCL	5.75		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	6.142
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics	Log-transformed Statistics		
Minimum	1.73	Minimum of Log Data	0.548
Maximum	65	Maximum of Log Data	4.174
Mean	29.18	Mean of log Data	3.205
Median	29.18	SD of log Data	0.801
SD	12.73		
Coefficient of Variation	0.436		
Skewness	1.075		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	35.2	95% H-UCL	58.93
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	65.73
95% Adjusted-CLT UCL (Chen-1995)	35.82	97.5% Chebyshev (MVUE) UCL	79.89
95% Modified-t UCL (Johnson-1978)	35.36	99% Chebyshev (MVUE) UCL	107.7

Gamma Distribution Test	Data Distribution		
k star (bias corrected)	2.499	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.68		
MLE of Mean	29.18		
MLE of Standard Deviation	18.46		
nu star	69.96		
Approximate Chi Square Value (.05)	51.71	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	34.77
Adjusted Chi Square Value	49.63	95% Jackknife UCL	35.2
		95% Standard Bootstrap UCL	34.6
Anderson-Darling Test Statistic	3.103	95% Bootstrap-t UCL	35.58
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	44.29
Kolmogorov-Smirnov Test Statistic	0.432	95% Percentile Bootstrap UCL	34.29
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	35.66
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	44.01
		97.5% Chebyshev(Mean, Sd) UCL	50.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	63.03
95% Approximate Gamma UCL	39.48		
95% Adjusted Gamma UCL	41.13		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	44.01
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 4

Raw Statistics		Log-transformed Statistics	
Minimum	0.024	Minimum of Log Data	-3.73
Maximum	0.193	Maximum of Log Data	-1.645
Mean	0.0895	Mean of log Data	-2.492
Median	0.0895	SD of log Data	0.442
SD	0.0356		
Coefficient of Variation	0.397		
Skewness	1.54		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.625	Shapiro Wilk Test Statistic	0.642
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.106	95% H-UCL	0.117
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.138
95% Adjusted-CLT UCL (Chen-1995)	0.109	97.5% Chebyshev (MVUE) UCL	0.159
95% Modified-t UCL (Johnson-1978)	0.107	99% Chebyshev (MVUE) UCL	0.199

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.177	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0173		
MLE of Mean	0.0895		
MLE of Standard Deviation	0.0394		
nu star	145		
Approximate Chi Square Value (.05)	118.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.105
Adjusted Chi Square Value	114.9	95% Jackknife UCL	0.106
		95% Standard Bootstrap UCL	0.105
Anderson-Darling Test Statistic	2.64	95% Bootstrap-t UCL	0.11
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	0.2
Kolmogorov-Smirnov Test Statistic	0.409	95% Percentile Bootstrap UCL	0.104
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	0.107
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.131
		97.5% Chebyshev(Mean, Sd) UCL	0.149
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.184
95% Approximate Gamma UCL	0.11		
95% Adjusted Gamma UCL	0.113		

Potential UCL to Use	Use 95% Student's-t UCL	0.106
	or 95% Modified-t UCL	0.107

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.894	Minimum of Log Data -0.112
Maximum	3.31	Maximum of Log Data 1.197
Mean	1.718	Mean of log Data 0.499
Median	1.718	SD of log Data 0.302
SD	0.541	
Coefficient of Variation	0.315	
Skewness	1.714	

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

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However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.61	Shapiro Wilk Test Statistic 0.66
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value 0.874
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.974	95% H-UCL 2.02
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 2.328
95% Adjusted-CLT UCL (Chen-1995)	2.026	97.5% Chebyshev (MVUE) UCL 2.592
95% Modified-t UCL (Johnson-1978)	1.985	99% Chebyshev (MVUE) UCL 3.111

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	9.493	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.181	
MLE of Mean	1.718	
MLE of Standard Deviation	0.557	
nu star	265.8	
Approximate Chi Square Value (.05)	229.1	Nonparametric Statistics
Adjusted Level of Significance	0.0312	95% CLT UCL 1.955
Adjusted Chi Square Value	224.5	95% Jackknife UCL 1.974
		95% Standard Bootstrap UCL 1.949
Anderson-Darling Test Statistic	2.674	95% Bootstrap-t UCL 2.047
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL 3.328
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL 1.945
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL 1.949
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 2.348
		97.5% Chebyshev(Mean, Sd) UCL 2.621
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 3.156
95% Approximate Gamma UCL	1.993	
95% Adjusted Gamma UCL	2.033	

Potential UCL to Use	Use 95% Student's-t UCL	1.974
	or 95% Modified-t UCL	1.985

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.7	Minimum of Log Data	-0.357
Maximum	10.5	Maximum of Log Data	2.351
Mean	5.6	Mean of log Data	1.602
Median	5.6	SD of log Data	0.643
SD	2.089		
Coefficient of Variation	0.373		
Skewness	-2.21E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.484
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	6.683	95% H-UCL	9.583
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.99
95% Adjusted-CLT UCL (Chen-1995)	6.592	97.5% Chebyshev (MVUE) UCL	13.16
95% Modified-t UCL (Johnson-1978)	6.683	99% Chebyshev (MVUE) UCL	17.42

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	3.277	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.709		
MLE of Mean	5.6		
MLE of Standard Deviation	3.094		
nu star	78.65		
Approximate Chi Square Value (.05)	59.22	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	6.592
Adjusted Chi Square Value	56.65	95% Jackknife UCL	6.683
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.942	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.229
		97.5% Chebyshev(Mean, Sd) UCL	9.367
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.6
95% Approximate Gamma UCL	7.438		
95% Adjusted Gamma UCL	7.775		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 8.229

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	6.4 Minimum of Log Data	1.856
Maximum	6.5 Maximum of Log Data	1.872
Mean	6.45 Mean of log Data	1.864
Median	6.45 SD of log Data	0.00331
SD	0.0213	
Coefficient of Variation	0.00331	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.461	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	6.46	95% Chebyshev (MVUE) UCL	6.477
95% Modified-t UCL (Johnson-1978)	6.461	97.5% Chebyshev (MVUE) UCL	6.488
		99% Chebyshev (MVUE) UCL	6.511

Gamma Distribution Test

k star (bias corrected)	74882	Data Distribution	
Theta Star	8.61E-05	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	6.45		
MLE of Standard Deviation	0.0236		
nu star	1797178		
Approximate Chi Square Value (.05)	1794061	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	6.46
Adjusted Chi Square Value	1793585	95% Jackknife UCL	6.461
		95% Standard Bootstrap UCL	N/A

Anderson-Darling Test Statistic	10.99	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.791	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.477
		97.5% Chebyshev(Mean, Sd) UCL	6.488
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.511
95% Approximate Gamma UCL	6.461		
95% Adjusted Gamma UCL	6.463		

Potential UCL to Use Use 95% Student's-t UCL 6.461
 or 95% Modified-t UCL 6.461

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	12.8	Minimum of Log Data	2.549
Maximum	258	Maximum of Log Data	5.553
Mean	135.4	Mean of log Data	4.765
Median	135.4	SD of log Data	0.722
SD	52.28		
Coefficient of Variation	0.386		
Skewness	-5.33E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.472
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	162.5	95% H-UCL	259.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	289.2
95% Adjusted-CLT UCL (Chen-1995)	160.2	97.5% Chebyshev (MVUE) UCL	350.1
95% Modified-t UCL (Johnson-1978)	162.5	99% Chebyshev (MVUE) UCL	469.8

Gamma Distribution Test

k star (bias corrected)	2.8	Data Distribution	
Theta Star	48.36	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	135.4		
MLE of Standard Deviation	80.92		
nu star	67.19		
Approximate Chi Square Value (.05)	49.33	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	160.2
Adjusted Chi Square Value	47	95% Jackknife UCL	162.5

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.983	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.486	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	201.2
		97.5% Chebyshev(Mean, Sd) UCL	229.6
		99% Chebyshev(Mean, Sd) UCL	285.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	184.4
95% Adjusted Gamma UCL	193.6

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 201.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	14.8 Minimum of Log Data	2.695
Maximum	231 Maximum of Log Data	5.442
Mean	122.9 Mean of log Data	4.688
Median	122.9 SD of log Data	0.653
SD	46.09	
Coefficient of Variation	0.375	
Skewness	5.19E-16	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.482
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	146.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	213.4
95% Adjusted-CLT UCL (Chen-1995)	144.8	95% Chebyshev (MVUE) UCL	244
95% Modified-t UCL (Johnson-1978)	146.8	97.5% Chebyshev (MVUE) UCL	292.6
		99% Chebyshev (MVUE) UCL	388

Gamma Distribution Test

k star (bias corrected)	3.204	Data Distribution	
Theta Star	38.36	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	122.9		
MLE of Standard Deviation	68.66		
nu star	76.9		
Approximate Chi Square Value (.05)	57.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	144.8
Adjusted Chi Square Value	55.17	95% Jackknife UCL	146.8

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.948	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.482	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	180.9
		97.5% Chebyshev(Mean, Sd) UCL	206
		99% Chebyshev(Mean, Sd) UCL	255.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	163.8
95% Adjusted Gamma UCL	171.3

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 180.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.1 Minimum of Log Data	-2.303
Maximum	7.7 Maximum of Log Data	2.041
Mean	3.9 Mean of log Data	1.112
Median	3.9 SD of log Data	1.093
SD	1.62	
Coefficient of Variation	0.415	
Skewness	5.47E-16	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.43
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.74	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.29
95% Adjusted-CLT UCL (Chen-1995)	4.669	95% Chebyshev (MVUE) UCL	12.78
95% Modified-t UCL (Johnson-1978)	4.74	97.5% Chebyshev (MVUE) UCL	16.07
		99% Chebyshev (MVUE) UCL	22.56

Gamma Distribution Test

k star (bias corrected)	1.678	Data Distribution	
Theta Star	2.324	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.9		
MLE of Standard Deviation	3.011		
nu star	40.27		
Approximate Chi Square Value (.05)	26.73	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	4.669
Adjusted Chi Square Value	25.06	95% Jackknife UCL	4.74

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.173	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.507	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	5.939
		97.5% Chebyshev(Mean, Sd) UCL	6.821
		99% Chebyshev(Mean, Sd) UCL	8.554

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.876
95% Adjusted Gamma UCL	6.268

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.939

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	13.7 Minimum of Log Data	2.617
Maximum	85.4 Maximum of Log Data	4.447
Mean	49.55 Mean of log Data	3.841
Median	49.55 SD of log Data	0.416
SD	15.29	
Coefficient of Variation	0.309	
Skewness	-8.89E-16	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.527
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	57.47	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	65.63
95% Adjusted-CLT UCL (Chen-1995)	56.81	95% Chebyshev (MVUE) UCL	77.23
95% Modified-t UCL (Johnson-1978)	57.47	97.5% Chebyshev (MVUE) UCL	88.84
		99% Chebyshev (MVUE) UCL	111.6

Gamma Distribution Test

k star (bias corrected)	6.249	Data Distribution	
Theta Star	7.929	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	49.55		
MLE of Standard Deviation	19.82		
nu star	150		
Approximate Chi Square Value (.05)	122.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	56.81
Adjusted Chi Square Value	118.9	95% Jackknife UCL	57.47

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.463	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	68.79
		97.5% Chebyshev(Mean, Sd) UCL	77.11
		99% Chebyshev(Mean, Sd) UCL	93.46

Assuming Gamma Distribution

95% Approximate Gamma UCL	60.58
95% Adjusted Gamma UCL	62.5

Potential UCL to Use

Use 95% Student's-t UCL	57.47
or 95% Modified-t UCL	57.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	0.13 Minimum of Log Data	-2.04
Maximum	35 Maximum of Log Data	3.555
Mean	3.443 Mean of log Data	-0.815
Median	0.239 SD of log Data	1.694
SD	9.979	
Coefficient of Variation	2.898	
Skewness	3.415	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.381 Shapiro Wilk Test Statistic	0.763
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.616	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16.75
95% Adjusted-CLT UCL (Chen-1995)	11.22	95% Chebyshev (MVUE) UCL	4.934
95% Modified-t UCL (Johnson-1978)	9.09	97.5% Chebyshev (MVUE) UCL	6.429
		99% Chebyshev (MVUE) UCL	9.365

Gamma Distribution Test

k star (bias corrected)	0.304	Data Distribution	
Theta Star	11.34	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.443		
MLE of Standard Deviation	6.248		
nu star	7.288		
Approximate Chi Square Value (.05)	2.33	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	8.181
Adjusted Chi Square Value	1.926	95% Jackknife UCL	8.616
		95% Standard Bootstrap UCL	7.886
Anderson-Darling Test Statistic	2.141	95% Bootstrap-t UCL	145.1
Anderson-Darling 5% Critical Value	0.818	95% Hall's Bootstrap UCL	76.07
Kolmogorov-Smirnov Test Statistic	0.351	95% Percentile Bootstrap UCL	9.006
Kolmogorov-Smirnov 5% Critical Value	0.264	95% BCA Bootstrap UCL	12.33
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16
		97.5% Chebyshev(Mean, Sd) UCL	21.43
		99% Chebyshev(Mean, Sd) UCL	32.11
Assuming Gamma Distribution			
95% Approximate Gamma UCL	10.77		
95% Adjusted Gamma UCL	13.03		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 32.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	2.1 Minimum of Log Data	0.742
Maximum	42.5 Maximum of Log Data	3.75
Mean	22.3 Mean of log Data	2.961
Median	22.3 SD of log Data	0.723
SD	8.613	
Coefficient of Variation	0.386	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.471
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	26.77	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	42.81
95% Adjusted-CLT UCL (Chen-1995)	26.39	95% Chebyshev (MVUE) UCL	47.69
95% Modified-t UCL (Johnson-1978)	26.77	97.5% Chebyshev (MVUE) UCL	57.74
		99% Chebyshev (MVUE) UCL	77.49

Gamma Distribution Test

k star (bias corrected)	2.794	Data Distribution	
Theta Star	7.981	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	22.3		
MLE of Standard Deviation	13.34		
nu star	67.06		
Approximate Chi Square Value (.05)	49.21	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	26.39
Adjusted Chi Square Value	46.88	95% Jackknife UCL	26.77

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.737	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.486	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	33.14
		97.5% Chebyshev(Mean, Sd) UCL	37.83
		99% Chebyshev(Mean, Sd) UCL	47.04

Assuming Gamma Distribution

95% Approximate Gamma UCL	30.39
95% Adjusted Gamma UCL	31.89

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 33.14

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.37	Minimum of Log Data	-0.994
Maximum	0.7	Maximum of Log Data	-0.357
Mean	0.535	Mean of log Data	-0.634
Median	0.535	SD of log Data	0.137
SD	0.0704		
Coefficient of Variation	0.132		
Skewness	-2.99E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.587
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.571	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.577
95% Adjusted-CLT UCL (Chen-1995)	0.568	95% Chebyshev (MVUE) UCL	0.628
95% Modified-t UCL (Johnson-1978)	0.571	97.5% Chebyshev (MVUE) UCL	0.668
		99% Chebyshev (MVUE) UCL	0.747

Gamma Distribution Test

k star (bias corrected)	45.2	Data Distribution	
Theta Star	0.0118	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.535		
MLE of Standard Deviation	0.0796		
nu star	1085		
Approximate Chi Square Value (.05)	1009	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.568
Adjusted Chi Square Value	998.3	95% Jackknife UCL	0.571

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.729	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.434	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.624
		97.5% Chebyshev(Mean, Sd) UCL	0.662
		99% Chebyshev(Mean, Sd) UCL	0.737

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.575
95% Adjusted Gamma UCL	0.581

Potential UCL to Use

Use 95% Student's-t UCL	0.571
or 95% Modified-t UCL	0.571

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	23.5	Minimum of Log Data	3.157
Maximum	42.1	Maximum of Log Data	3.74
Mean	32.8	Mean of log Data	3.483
Median	32.8	SD of log Data	0.125
SD	3.966		
Coefficient of Variation	0.121		
Skewness	-3.18E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.589
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	34.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	35.13
95% Adjusted-CLT UCL (Chen-1995)	34.68	95% Chebyshev (MVUE) UCL	37.99
95% Modified-t UCL (Johnson-1978)	34.86	97.5% Chebyshev (MVUE) UCL	40.23
		99% Chebyshev (MVUE) UCL	44.64

Gamma Distribution Test

k star (bias corrected)	53.87	Data Distribution	
Theta Star	0.609	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	32.8		
MLE of Standard Deviation	4.469		
nu star	1293		
Approximate Chi Square Value (.05)	1210	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	34.68
Adjusted Chi Square Value	1198	95% Jackknife UCL	34.86

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.727	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.432	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	37.79
		97.5% Chebyshev(Mean, Sd) UCL	39.95
		99% Chebyshev(Mean, Sd) UCL	44.19

Assuming Gamma Distribution

95% Approximate Gamma UCL	35.04
95% Adjusted Gamma UCL	35.39

Potential UCL to Use

Use 95% Student's-t UCL	34.86
or 95% Modified-t UCL	34.86

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	11.8	Minimum of Log Data	2.468
Maximum	17.1	Maximum of Log Data	2.839
Mean	13.83	Mean of log Data	2.623
Median	13.83	SD of log Data	0.0875
SD	1.251		
Coefficient of Variation	0.091		
Skewness	1.297		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.711	Shapiro Wilk Test Statistic	0.734
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	14.47	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	15.35
95% Adjusted-CLT UCL (Chen-1995)	14.56	97.5% Chebyshev (MVUE) UCL	16.01
95% Modified-t UCL (Johnson-1978)	14.5	99% Chebyshev (MVUE) UCL	17.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	104.9	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.132		
MLE of Mean	13.83		
MLE of Standard Deviation	1.35		
nu star	2518		
Approximate Chi Square Value (.05)	2403	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	14.42
Adjusted Chi Square Value	2385	95% Jackknife UCL	14.47
		95% Standard Bootstrap UCL	14.39
Anderson-Darling Test Statistic	1.786	95% Bootstrap-t UCL	14.57
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	15.71
Kolmogorov-Smirnov Test Statistic	0.345	95% Percentile Bootstrap UCL	14.39
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	14.52
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.4
		97.5% Chebyshev(Mean, Sd) UCL	16.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.42
95% Approximate Gamma UCL	14.49		
95% Adjusted Gamma UCL	14.59		

Potential UCL to Use

Use 95% Student's-t UCL	14.47
or 95% Modified-t UCL	14.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.1 Minimum of Log Data	-2.303
Maximum	0.365 Maximum of Log Data	-1.008
Mean	0.182 Mean of log Data	-1.759
Median	0.182 SD of log Data	0.343
SD	0.068	
Coefficient of Variation	0.371	
Skewness	1.732	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.75 Shapiro Wilk Test Statistic	0.831
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.217 95% H-UCL	0.224
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.261
95% Adjusted-CLT UCL (Chen-1995)	0.224 97.5% Chebyshev (MVUE) UCL	0.295
95% Modified-t UCL (Johnson-1978)	0.219 99% Chebyshev (MVUE) UCL	0.363

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.948 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.026	
MLE of Mean	0.182	
MLE of Standard Deviation	0.069	
nu star	166.7	
Approximate Chi Square Value (.05)	137.9 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	0.214
Adjusted Chi Square Value	133.9 95% Jackknife UCL	0.217
	95% Standard Bootstrap UCL	0.213
Anderson-Darling Test Statistic	1.124 95% Bootstrap-t UCL	0.227
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	0.386
Kolmogorov-Smirnov Test Statistic	0.294 95% Percentile Bootstrap UCL	0.218
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	0.225
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.267
	97.5% Chebyshev(Mean, Sd) UCL	0.304
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.376
95% Approximate Gamma UCL	0.22	
95% Adjusted Gamma UCL	0.227	

Potential UCL to Use

Use 95% Student's-t UCL	0.217
or 95% Modified-t UCL	0.219

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.449	Minimum of Log Data -0.801
Maximum	0.95	Maximum of Log Data -0.0513
Mean	0.669	Mean of log Data -0.414
Median	0.669	SD of log Data 0.162
SD	0.109	
Coefficient of Variation	0.163	
Skewness	0.957	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.662	Shapiro Wilk Test Statistic 0.676
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.725	95% H-UCL 0.732
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.806
95% Adjusted-CLT UCL (Chen-1995)	0.73	97.5% Chebyshev (MVUE) UCL 0.865
95% Modified-t UCL (Johnson-1978)	0.727	99% Chebyshev (MVUE) UCL 0.981

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	31.46	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0213	
MLE of Mean	0.669	
MLE of Standard Deviation	0.119	
nu star	755.1	
Approximate Chi Square Value (.05)	692.4	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 0.721
Adjusted Chi Square Value	683.2	95% Jackknife UCL 0.725
		95% Standard Bootstrap UCL 0.719
Anderson-Darling Test Statistic	2.171	95% Bootstrap-t UCL 0.73
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL 0.799
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL 0.716
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL 0.721
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.806
		97.5% Chebyshev(Mean, Sd) UCL 0.866
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.982
95% Approximate Gamma UCL	0.729	
95% Adjusted Gamma UCL	0.739	

Potential UCL to Use

Use 95% Student's-t UCL	0.725
or 95% Modified-t UCL	0.727

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	12.4	Minimum of Log Data 2.518
Maximum	137	Maximum of Log Data 4.92
Mean	54.83	Mean of log Data 3.849
Median	54.83	SD of log Data 0.634
SD	30.35	
Coefficient of Variation	0.553	
Skewness	1.622	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.655	Shapiro Wilk Test Statistic 0.688
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	70.57	95% H-UCL 89.44
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 102.9
95% Adjusted-CLT UCL (Chen-1995)	73.63	97.5% Chebyshev (MVUE) UCL 123
95% Modified-t UCL (Johnson-1978)	71.25	99% Chebyshev (MVUE) UCL 162.6

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.592	Data do not follow a Discernable Distribution (0.05)
Theta Star	21.15	
MLE of Mean	54.83	
MLE of Standard Deviation	34.06	
nu star	62.22	
Approximate Chi Square Value (.05)	45.07	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 69.24
Adjusted Chi Square Value	42.86	95% Jackknife UCL 70.57
		95% Standard Bootstrap UCL 69.01
Anderson-Darling Test Statistic	2.064	95% Bootstrap-t UCL 75.36
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL 143.8
Kolmogorov-Smirnov Test Statistic	0.406	95% Percentile Bootstrap UCL 68.53
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL 75.38
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 93.02
		97.5% Chebyshev(Mean, Sd) UCL 109.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 142
95% Approximate Gamma UCL	75.69	
95% Adjusted Gamma UCL	79.61	

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	93.02
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt-60 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	4.95	Minimum of Log Data 1.599
Maximum	63.8	Maximum of Log Data 4.156
Mean	30.72	Mean of log Data 3.311
Median	30.72	SD of log Data 0.587
SD	12.83	
Coefficient of Variation	0.418	
Skewness	0.966	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.663	Shapiro Wilk Test Statistic 0.587
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	37.37	95% H-UCL 48.49
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 56.42
95% Adjusted-CLT UCL (Chen-1995)	37.91	97.5% Chebyshev (MVUE) UCL 66.97
95% Modified-t UCL (Johnson-1978)	37.54	99% Chebyshev (MVUE) UCL 87.69

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	3.469	Data do not follow a Discernable Distribution (0.05)
Theta Star	8.856	
MLE of Mean	30.72	
MLE of Standard Deviation	16.49	
nu star	83.25	
Approximate Chi Square Value (.05)	63.22	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 36.81
Adjusted Chi Square Value	60.56	95% Jackknife UCL 37.37
		95% Standard Bootstrap UCL 36.65
Anderson-Darling Test Statistic	2.3	95% Bootstrap-t UCL 37.89
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL 46.15
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL 36.23
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL 36.84
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 46.87
		97.5% Chebyshev(Mean, Sd) UCL 53.85
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 67.58
95% Approximate Gamma UCL	40.45	
95% Adjusted Gamma UCL	42.22	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 46.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.13	Minimum of Log Data	-2.04
Maximum	8.5	Maximum of Log Data	2.14
Mean	1.055	Mean of log Data	-1.053
Median	0.2	SD of log Data	1.291
SD	2.371		
Coefficient of Variation	2.247		
Skewness	3.332		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.765
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	2.284	95% H-UCL	3.096
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.992
95% Adjusted-CLT UCL (Chen-1995)	2.884	97.5% Chebyshev (MVUE) UCL	2.543
95% Modified-t UCL (Johnson-1978)	2.394	99% Chebyshev (MVUE) UCL	3.624

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.478	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.205		
MLE of Mean	1.055		
MLE of Standard Deviation	1.525		
nu star	11.48		
Approximate Chi Square Value (.05)	4.887	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	2.181
Adjusted Chi Square Value	4.249	95% Jackknife UCL	2.284
		95% Standard Bootstrap UCL	2.159
Anderson-Darling Test Statistic	1.775	95% Bootstrap-t UCL	7.461
Anderson-Darling 5% Critical Value	0.78	95% Hall's Bootstrap UCL	6.407
Kolmogorov-Smirnov Test Statistic	0.36	95% Percentile Bootstrap UCL	2.373
Kolmogorov-Smirnov 5% Critical Value	0.258	95% BCA Bootstrap UCL	3.148
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.038
		97.5% Chebyshev(Mean, Sd) UCL	5.329
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.865
95% Approximate Gamma UCL	2.478		
95% Adjusted Gamma UCL	2.85		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 4.038

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thorium-230 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	001-05.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Beryllium

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	5
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.488	Minimum of Log Data	-0.717
Maximum	8.3	Maximum of Log Data	2.116
Mean	2.475	Mean of log Data	0.527
Median	2.475	SD of log Data	0.957
SD	2.378		
Coefficient of Variation	0.961		
Skewness	2.098		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.695	Shapiro Wilk Test Statistic	0.829
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	3.949	95% H-UCL	7.755
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	6.111
95% Adjusted-CLT UCL (Chen-1995)	4.371	97.5% Chebyshev (MVUE) UCL	7.671
95% Modified-t UCL (Johnson-1978)	4.041	99% Chebyshev (MVUE) UCL	10.73

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.049	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	2.358		
MLE of Mean	2.475		
MLE of Standard Deviation	2.416		
nu star	18.89		
Approximate Chi Square Value (.05)	10.04	Nonparametric Statistics	
Adjusted Level of Significance	0.0231	95% CLT UCL	3.779
Adjusted Chi Square Value	8.709	95% Jackknife UCL	3.949
		95% Standard Bootstrap UCL	3.701
Anderson-Darling Test Statistic	0.858	95% Bootstrap-t UCL	4.98
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	9.278
Kolmogorov-Smirnov Test Statistic	0.279	95% Percentile Bootstrap UCL	3.769
Kolmogorov-Smirnov 5% Critical Value	0.284	95% BCA Bootstrap UCL	4.21
Data follow Appr. Gamma Distribution at 5% Significan		95% Chebyshev(Mean, Sd) UCL	5.93
		97.5% Chebyshev(Mean, Sd) UCL	7.426
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.36
95% Approximate Gamma UCL	4.657		
95% Adjusted Gamma UCL	5.368		

Potential UCL to Use Use 95% Approximate Gamma UCL 4.657

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.0489 Minimum of Log Data	-3.018
Maximum	1.95 Maximum of Log Data	0.668
Mean	0.812 Mean of log Data	-0.692
Median	0.812 SD of log Data	1.351
SD	0.571	
Coefficient of Variation	0.704	
Skewness	0.555	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.854 Shapiro Wilk Test Statistic	0.705
Shapiro Wilk Critical Value	0.829 Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.166 95% H-UCL	8.701
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	3.235
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	4.173
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	6.017

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.856 Data appear Normal at 5% Significance Level	
Theta Star	0.949	
MLE of Mean	0.812	
MLE of Standard Deviation	0.878	
nu star	15.4	
Approximate Chi Square Value (.05)	7.543 Nonparametric Statistics	
Adjusted Level of Significance	0.0231 95% CLT UCL	1.125
Adjusted Chi Square Value	6.418 95% Jackknife UCL	1.166
	95% Standard Bootstrap UCL	1.105
Anderson-Darling Test Statistic	1.179 95% Bootstrap-t UCL	1.193
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	1.384
Kolmogorov-Smirnov Test Statistic	0.4 95% Percentile Bootstrap UCL	1.15
Kolmogorov-Smirnov 5% Critical Value	0.286 95% BCA Bootstrap UCL	1.109
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.642
	97.5% Chebyshev(Mean, Sd) UCL	2.001
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2.706
95% Approximate Gamma UCL	1.658	
95% Adjusted Gamma UCL	1.949	

Potential UCL to Use Use 95% Student's-t UCL 1.166

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	5
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Raw Statistics		Log-transformed Statistics	
Minimum	7.22	Minimum of Log Data	1.977
Maximum	40.7	Maximum of Log Data	3.706
Mean	20.11	Mean of log Data	2.918
Median	20.11	SD of log Data	0.444
SD	8.804		
Coefficient of Variation	0.438		
Skewness	1.526		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.763	Shapiro Wilk Test Statistic	0.812
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Lognormal Distribution

95% Student's-t UCL	25.56	95% H-UCL	28.75
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	33.35
95% Adjusted-CLT UCL (Chen-1995)	26.53	97.5% Chebyshev (MVUE) UCL	39.05
95% Modified-t UCL (Johnson-1978)	25.81	99% Chebyshev (MVUE) UCL	50.25

Gamma Distribution Test

Data Distribution

k star (bias corrected)	4.21	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.776		
MLE of Mean	20.11		
MLE of Standard Deviation	9.799		
nu star	75.77		

Approximate Chi Square Value (.05)

Nonparametric Statistics

Adjusted Level of Significance	0.0231	95% CLT UCL	24.93
Adjusted Chi Square Value	53.26	95% Jackknife UCL	25.56
		95% Standard Bootstrap UCL	24.62

Anderson-Darling Test Statistic	0.975	95% Bootstrap-t UCL	27.65
Anderson-Darling 5% Critical Value	0.723	95% Hall's Bootstrap UCL	52.56
Kolmogorov-Smirnov Test Statistic	0.335	95% Percentile Bootstrap UCL	24.68
Kolmogorov-Smirnov 5% Critical Value	0.28	95% BCA Bootstrap UCL	26.06
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	32.9
		97.5% Chebyshev(Mean, Sd) UCL	38.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	49.3
95% Approximate Gamma UCL	26.86		
95% Adjusted Gamma UCL	28.6		

Potential UCL to Use	Use 95% Student's-t UCL	25.56
	or 95% Modified-t UCL	25.81

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.12 Minimum of Log Data	-2.12
Maximum	0.855 Maximum of Log Data	-0.157
Mean	0.259 Mean of log Data	-1.575
Median	0.2 SD of log Data	0.642
SD	0.233	
Coefficient of Variation	0.898	
Skewness	2.561	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627 Shapiro Wilk Test Statistic	0.814
Shapiro Wilk Critical Value	0.829 Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.404 95% H-UCL	0.45
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.484
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	0.586
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	0.786

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.656 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.157	
MLE of Mean	0.259	
MLE of Standard Deviation	0.201	
nu star	29.8	
Approximate Chi Square Value (.05)	18.34 Nonparametric Statistics	
Adjusted Level of Significance	0.0231 95% CLT UCL	0.387
Adjusted Chi Square Value	16.47 95% Jackknife UCL	0.404
	95% Standard Bootstrap UCL	0.376
Anderson-Darling Test Statistic	0.899 95% Bootstrap-t UCL	0.632
Anderson-Darling 5% Critical Value	0.729 95% Hall's Bootstrap UCL	0.862
Kolmogorov-Smirnov Test Statistic	0.279 95% Percentile Bootstrap UCL	0.399
Kolmogorov-Smirnov 5% Critical Value	0.282 95% BCA Bootstrap UCL	0.472
Data follow Appr. Gamma Distribution at 5% Significan	95% Chebyshev(Mean, Sd) UCL	0.597
	97.5% Chebyshev(Mean, Sd) UCL	0.744
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.031
95% Approximate Gamma UCL	0.421	
95% Adjusted Gamma UCL	0.469	

Potential UCL to Use Use 95% Approximate Gamma UCL 0.421

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 9 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	0.0875 Minimum of Log Data	-2.436
Maximum	0.39 Maximum of Log Data	-0.942
Mean	0.226 Mean of log Data	-1.581
Median	0.226 SD of log Data	0.494
SD	0.0957	
Coefficient of Variation	0.422	
Skewness	0.128	

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.876 Shapiro Wilk Test Statistic	0.829
Shapiro Wilk Critical Value	0.829 Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Lognormal Distribution

95% Student's-t UCL	0.286 95% H-UCL	0.343
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.396
95% Adjusted-CLT UCL (Chen-1995)	0.28 97.5% Chebyshev (MVUE) UCL	0.468
95% Modified-t UCL (Johnson-1978)	0.286 99% Chebyshev (MVUE) UCL	0.61

Gamma Distribution Test

Data Distribution

k star (bias corrected)	3.649 Data appear Normal at 5% Significance Level	
Theta Star	0.0621	
MLE of Mean	0.226	
MLE of Standard Deviation	0.119	
nu star	65.69	
Approximate Chi Square Value (.05)	48.04 Nonparametric Statistics	
Adjusted Level of Significance	0.0231 95% CLT UCL	0.279
Adjusted Chi Square Value	44.87 95% Jackknife UCL	0.286
	95% Standard Bootstrap UCL	0.276
Anderson-Darling Test Statistic	0.805 95% Bootstrap-t UCL	0.29
Anderson-Darling 5% Critical Value	0.723 95% Hall's Bootstrap UCL	0.308
Kolmogorov-Smirnov Test Statistic	0.335 95% Percentile Bootstrap UCL	0.278
Kolmogorov-Smirnov 5% Critical Value	0.28 95% BCA Bootstrap UCL	0.274
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.365
	97.5% Chebyshev(Mean, Sd) UCL	0.426
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.544
95% Approximate Gamma UCL	0.31	
95% Adjusted Gamma UCL	0.332	

Potential UCL to Use Use 95% Student's-t UCL 0.286

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	099-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	8
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Raw Statistics

Minimum	8590	Log-transformed Statistics	
Maximum	15000	Minimum of Log Data	9.058
Mean	10931	Maximum of Log Data	9.616
Median	10931	Mean of log Data	9.289
SD	1628	SD of log Data	0.144
Coefficient of Variation	0.149		
Skewness	0.942		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.846	Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11645	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11679
95% Adjusted-CLT UCL (Chen-1995)	11703	95% Chebyshev (MVUE) UCL	12650
95% Modified-t UCL (Johnson-1978)	11661	97.5% Chebyshev (MVUE) UCL	13395
		99% Chebyshev (MVUE) UCL	14857

Gamma Distribution Test

k star (bias corrected)	41.16	Data Distribution	
Theta Star	265.6	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10931		
MLE of Standard Deviation	1704		
nu star	1317		
Approximate Chi Square Value (.05)	1234	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	11601
Adjusted Chi Square Value	1225	95% Jackknife UCL	11645
		95% Standard Bootstrap UCL	11591
Anderson-Darling Test Statistic	1.178	95% Bootstrap-t UCL	11850
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	12235
Kolmogorov-Smirnov Test Statistic	0.294	95% Percentile Bootstrap UCL	11585
Kolmogorov-Smirnov 5% Critical Value	0.214	95% BCA Bootstrap UCL	11734
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12706
		97.5% Chebyshev(Mean, Sd) UCL	13474
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14982
95% Approximate Gamma UCL	11669		
95% Adjusted Gamma UCL	11757		

Potential UCL to Use

Use 95% Student's-t UCL	11645
or 95% Modified-t UCL	11661

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 16

Raw Statistics

Minimum	6.51	Log-transformed Statistics	
Maximum	12.4	Minimum of Log Data	1.873
Mean	9.183	Maximum of Log Data	2.518
Median	8.61	Mean of log Data	2.201
SD	1.72E+00	SD of log Data	0.185
Coefficient of Variation	0.187		
Skewness	0.479		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.935	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.01
95% Adjusted-CLT UCL (Chen-1995)	9.943	95% Chebyshev (MVUE) UCL	11.04
95% Modified-t UCL (Johnson-1978)	9.943	97.5% Chebyshev (MVUE) UCL	11.85
		99% Chebyshev (MVUE) UCL	13.43

Gamma Distribution Test

k star (bias corrected)	25.44	Data Distribution	
Theta Star	0.361	Data appear Normal at 5% Significance Level	
MLE of Mean	9.183		
MLE of Standard Deviation	1.821		
nu star	814		
Approximate Chi Square Value (.05)	748.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	9.888
Adjusted Chi Square Value	741.6	95% Jackknife UCL	9.935
		95% Standard Bootstrap UCL	9.875
Anderson-Darling Test Statistic	0.417	95% Bootstrap-t UCL	10.11
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	9.953
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	9.883
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	9.893
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.05
		97.5% Chebyshev(Mean, Sd) UCL	11.86
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.45
95% Approximate Gamma UCL	9.983		
95% Adjusted Gamma UCL	10.08		

Potential UCL to Use Use 95% Student's-t UCL 9.935

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	76.7 Minimum of Log Data	4.34
Maximum	192 Maximum of Log Data	5.257
Mean	123.5 Mean of log Data	4.794
Median	123.5 SD of log Data	0.218
SD	26.18	
Coefficient of Variation	0.212	
Skewness	0.548	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.818 Shapiro Wilk Test Statistic	0.814
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	134.9 95% H-UCL	137
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	153.1
95% Adjusted-CLT UCL (Chen-1995)	135.2 97.5% Chebyshev (MVUE) UCL	165.9
95% Modified-t UCL (Johnson-1978)	135.1 99% Chebyshev (MVUE) UCL	191

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	18.97 Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.507	
MLE of Mean	123.5	
MLE of Standard Deviation	28.34	
nu star	607.1	
Approximate Chi Square Value (.05)	550.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	134.2
Adjusted Chi Square Value	544.8 95% Jackknife UCL	134.9
	95% Standard Bootstrap UCL	133.7
Anderson-Darling Test Statistic	1.563 95% Bootstrap-t UCL	135.9
Anderson-Darling 5% Critical Value	0.736 95% Hall's Bootstrap UCL	139.9
Kolmogorov-Smirnov Test Statistic	0.34 95% Percentile Bootstrap UCL	134.5
Kolmogorov-Smirnov 5% Critical Value	0.215 95% BCA Bootstrap UCL	134.9
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	152
	97.5% Chebyshev(Mean, Sd) UCL	164.3
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	188.6
95% Approximate Gamma UCL	136	
95% Adjusted Gamma UCL	137.6	

Potential UCL to Use

Use 95% Student's-t UCL 134.9
or 95% Modified-t UCL 135.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.486	Minimum of Log Data	-0.722
Maximum		1 Maximum of Log Data	0
Mean	0.668	Mean of log Data	-0.418
Median	0.668	SD of log Data	0.174
SD	0.123		
Coefficient of Variation	0.185		
Skewness	1.326		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.783	Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.722	95% H-UCL	0.724
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.795
95% Adjusted-CLT UCL (Chen-1995)	0.73	97.5% Chebyshev (MVUE) UCL	0.85
95% Modified-t UCL (Johnson-1978)	0.724	99% Chebyshev (MVUE) UCL	0.958

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	27.84	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.024		
MLE of Mean	0.668		
MLE of Standard Deviation	0.127		
nu star	890.9		
Approximate Chi Square Value (.05)	822.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	0.719
Adjusted Chi Square Value	815.2	95% Jackknife UCL	0.722
		95% Standard Bootstrap UCL	0.717
Anderson-Darling Test Statistic	1.581	95% Bootstrap-t UCL	0.744
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	1.062
Kolmogorov-Smirnov Test Statistic	0.352	95% Percentile Bootstrap UCL	0.718
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	0.726
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.802
		97.5% Chebyshev(Mean, Sd) UCL	0.861
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.975
95% Approximate Gamma UCL	0.723		
95% Adjusted Gamma UCL	0.73		

Potential UCL to Use

Use 95% Student's-t UCL 0.722
or 95% Modified-t UCL 0.724

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 16

Raw Statistics

Minimum	14.5	Minimum of Log Data	2.674
Maximum	116.8	Maximum of Log Data	4.76
Mean	52.22	Mean of log Data	3.879
Median	51.98	SD of log Data	0.424
SD	21.21		
Coefficient of Variation	0.406		
Skewness	1.671		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.819	Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	61.52	95% H-UCL	65.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	77.47
95% Adjusted-CLT UCL (Chen-1995)	63.31	97.5% Chebyshev (MVUE) UCL	88.23
95% Modified-t UCL (Johnson-1978)	61.89	99% Chebyshev (MVUE) UCL	109.4

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	5.474	Data Distribution	
Theta Star	9.539	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	52.22		
MLE of Standard Deviation	22.32		
nu star	175.2		
Approximate Chi Square Value (.05)	145.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	60.95
Adjusted Chi Square Value	142.5	95% Jackknife UCL	61.52
		95% Standard Bootstrap UCL	60.51
Anderson-Darling Test Statistic	0.877	95% Bootstrap-t UCL	64.43
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	113.7
Kolmogorov-Smirnov Test Statistic	0.19	95% Percentile Bootstrap UCL	60.97
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	62.42
Data follow Appr. Gamma Distribution at 5% Significance		95% Chebyshev(Mean, Sd) UCL	75.34
		97.5% Chebyshev(Mean, Sd) UCL	85.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	105
95% Approximate Gamma UCL	62.85		
95% Adjusted Gamma UCL	64.2		

Potential UCL to Use Use 95% Approximate Gamma UCL 62.85

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics
Minimum	-0.00983 Log Statistics Not Available
Maximum	0.0212
Mean	0.00569
Median	0.00569
SD	0.00567
Coefficient of Variation	9.97E-01
Skewness	5.32E-16

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.511 Not Available
Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.00817	95% H-UCL N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)
95% Student's-t UCL	0.00817	95% Adjusted-CLT UCL (Chen 1995) 0.00801
		95% Modified-t UCL (Johnson-1978) 0.00817

Gamma Distribution Test Data Distribution
 Gamma Statistics Not Available Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use			
Use 95% Chebyshev (Mean, Sd) UCL	0.0119	95% CLT UCL	0.00801
		95% Jackknife UCL	0.00817
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.0119
		97.5% Chebyshev(Mean, Sd) UCL	0.0145
		99% Chebyshev(Mean, Sd) UCL	0.0198

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 16

Raw Statistics

	Log-transformed Statistics	
Minimum	381.6 Minimum of Log Data	5.944
Maximum	1230 Maximum of Log Data	7.115
Mean	541.8 Mean of log Data	6.254
Median	516.2 SD of log Data	0.271
SD	196.6	
Coefficient of Variation	0.363	
Skewness	3.15	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615 Shapiro Wilk Test Statistic	0.782
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	628 95% H-UCL	613.9
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	698.7
95% Adjusted-CLT UCL (Chen-1995)	664 97.5% Chebyshev (MVUE) UCL	768.3
95% Modified-t UCL (Johnson-1978)	634.4 99% Chebyshev (MVUE) UCL	904.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	9.99 Data do not follow a Discernable Distribution (0.05)	
Theta Star	54.24	
MLE of Mean	541.8	
MLE of Standard Deviation	171.4	
nu star	319.7	
Approximate Chi Square Value (.05)	279.2 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	622.7
Adjusted Chi Square Value	275 95% Jackknife UCL	628
	95% Standard Bootstrap UCL	619.2
Anderson-Darling Test Statistic	1.353 95% Bootstrap-t UCL	731.7
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	963.8
Kolmogorov-Smirnov Test Statistic	0.262 95% Percentile Bootstrap UCL	632.1
Kolmogorov-Smirnov 5% Critical Value	0.215 95% BCA Bootstrap UCL	673.9
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	756.1
	97.5% Chebyshev(Mean, Sd) UCL	848.8
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1031
95% Approximate Gamma UCL	620.2	
95% Adjusted Gamma UCL	629.9	

Potential UCL to Use

Use 95% Student's-t UCL 628
or 95% Modified-t UCL 634.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 10

Raw Statistics

Minimum	0.0135	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.305
Mean	5.812	Maximum of Log Data	2.303
Median	8.375	Mean of log Data	0.263
SD	4.735	SD of log Data	2.654
Coefficient of Variation	0.815		
Skewness	-0.407		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.712	Shapiro Wilk Test Statistic	0.72
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.887	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2247
95% Adjusted-CLT UCL (Chen-1995)	7.63	95% Chebyshev (MVUE) UCL	95.86
95% Modified-t UCL (Johnson-1978)	7.867	97.5% Chebyshev (MVUE) UCL	127.6
		99% Chebyshev (MVUE) UCL	190

Gamma Distribution Test

k star (bias corrected)	0.394	Data Distribution	
Theta Star	14.74	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.812		
MLE of Standard Deviation	9.257		
nu star	12.61		
Approximate Chi Square Value (.05)	5.634	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	7.759
Adjusted Chi Square Value	5.111	95% Jackknife UCL	7.887
		95% Standard Bootstrap UCL	7.727
Anderson-Darling Test Statistic	2.373	95% Bootstrap-t UCL	7.736
Anderson-Darling 5% Critical Value	0.81	95% Hall's Bootstrap UCL	7.475
Kolmogorov-Smirnov Test Statistic	0.319	95% Percentile Bootstrap UCL	7.638
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	7.549
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.97
		97.5% Chebyshev(Mean, Sd) UCL	13.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.59
95% Approximate Gamma UCL	13.01		
95% Adjusted Gamma UCL	14.34		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 17.59

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	10.2 Minimum of Log Data	2.322
Maximum	90.47 Maximum of Log Data	4.505
Mean	56.37 Mean of log Data	3.843
Median	65 SD of log Data	0.74
SD	26.43	
Coefficient of Variation	0.469	
Skewness	-0.888	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test	0.829 Shapiro Wilk Test Statistic	0.728
Shapiro Wilk Test Statistic	0.887 Shapiro Wilk Critical Value	0.887
Shapiro Wilk Critical Value		
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	67.95 95% H-UCL	95.86
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	111.7
95% Adjusted-CLT UCL (Chen-1995)	65.67 97.5% Chebyshev (MVUE) UCL	134
95% Modified-t UCL (Johnson-1978)	67.71 99% Chebyshev (MVUE) UCL	177.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.321 Data do not follow a Discernable Distribution (0.05)	
Theta Star	24.29	
MLE of Mean	56.37	
MLE of Standard Deviation	37	
nu star	74.26	
Approximate Chi Square Value (.05)	55.42 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	67.24
Adjusted Chi Square Value	53.57 95% Jackknife UCL	67.95
	95% Standard Bootstrap UCL	66.96
Anderson-Darling Test Statistic	1.922 95% Bootstrap-t UCL	67.2
Anderson-Darling 5% Critical Value	0.745 95% Hall's Bootstrap UCL	65.58
Kolmogorov-Smirnov Test Statistic	0.329 95% Percentile Bootstrap UCL	66.51
Kolmogorov-Smirnov 5% Critical Value	0.217 95% BCA Bootstrap UCL	65.86
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	85.17
	97.5% Chebyshev(Mean, Sd) UCL	97.63
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	122.1
95% Approximate Gamma UCL	75.54	
95% Adjusted Gamma UCL	78.15	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 85.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	10.3	Maximum of Log Data	2.332
Mean	6.951	Mean of log Data	0.859
Median	10	SD of log Data	2.414
SD	4.42		
Coefficient of Variation	0.636		
Skewness	-0.932		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.678	Shapiro Wilk Test Statistic	0.614
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	8.888	95% H-UCL	1157
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	105.3
95% Adjusted-CLT UCL (Chen-1995)	8.494	97.5% Chebyshev (MVUE) UCL	139.6
95% Modified-t UCL (Johnson-1978)	8.845	99% Chebyshev (MVUE) UCL	206.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.509	Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.65		
MLE of Mean	6.951		
MLE of Standard Deviation	9.74		
nu star	16.3		
Approximate Chi Square Value (.05)	8.172	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	8.768
Adjusted Chi Square Value	7.524	95% Jackknife UCL	8.888
		95% Standard Bootstrap UCL	8.72
Anderson-Darling Test Statistic	3.214	95% Bootstrap-t UCL	8.609
Anderson-Darling 5% Critical Value	0.79	95% Hall's Bootstrap UCL	8.477
Kolmogorov-Smirnov Test Statistic	0.386	95% Percentile Bootstrap UCL	8.685
Kolmogorov-Smirnov 5% Critical Value	0.226	95% BCA Bootstrap UCL	8.571
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.77
		97.5% Chebyshev(Mean, Sd) UCL	13.85
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.94
95% Approximate Gamma UCL	13.86		
95% Adjusted Gamma UCL	15.06		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.94

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.97	Minimum of Log Data	-0.0305
Maximum	20	Maximum of Log Data	2.996
Mean	11.67	Mean of log Data	2.119
Median	10.16	SD of log Data	0.995
SD	7.623		
Coefficient of Variation	0.653		
Skewness	-0.0514		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.843
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	15.01	95% H-UCL	27.29
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.65
95% Adjusted-CLT UCL (Chen-1995)	14.78	97.5% Chebyshev (MVUE) UCL	35.39
95% Modified-t UCL (Johnson-1978)	15.01	99% Chebyshev (MVUE) UCL	48.63

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.363	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	8.565		
MLE of Mean	11.67		
MLE of Standard Deviation	9.998		
nu star	43.6		
Approximate Chi Square Value (.05)	29.46	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	14.8
Adjusted Chi Square Value	28.14	95% Jackknife UCL	15.01
		95% Standard Bootstrap UCL	14.71
Anderson-Darling Test Statistic	0.849	95% Bootstrap-t UCL	14.92
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	14.67
Kolmogorov-Smirnov Test Statistic	0.218	95% Percentile Bootstrap UCL	14.75
Kolmogorov-Smirnov 5% Critical Value	0.219	95% BCA Bootstrap UCL	14.74
Data follow Appr. Gamma Distribution at 5% Significance		95% Chebyshev(Mean, Sd) UCL	19.98
		97.5% Chebyshev(Mean, Sd) UCL	23.57
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	30.63
95% Approximate Gamma UCL	17.27		
95% Adjusted Gamma UCL	18.08		

Potential UCL to Use Use 95% Approximate Gamma UCL 17.27

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.455 Minimum of Log Data	-0.787
Maximum	1.3 Maximum of Log Data	0.262
Mean	0.878 Mean of log Data	-0.147
Median	0.878 SD of log Data	0.197
SD	0.154	
Coefficient of Variation	0.176	
Skewness	2.02E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.511 Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.945 95% H-UCL	0.964
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.069
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	1.151
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	1.312

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	24.82 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0354	
MLE of Mean	0.878	
MLE of Standard Deviation	0.176	
nu star	794.3	
Approximate Chi Square Value (.05)	729.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	0.941
Adjusted Chi Square Value	722.9 95% Jackknife UCL	0.945
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.212 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.736 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.462 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.215 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.046
	97.5% Chebyshev(Mean, Sd) UCL	1.118
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.261
95% Approximate Gamma UCL	0.955	
95% Adjusted Gamma UCL	0.964	

Potential UCL to Use Use 95% Student's-t UCL 0.945
 or 95% Modified-t UCL 0.945

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	099-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	10
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Raw Statistics

		Log-transformed Statistics	
Minimum	11	Minimum of Log Data	2.398
Maximum	85	Maximum of Log Data	4.443
Mean	56.34	Mean of log Data	3.895
Median	55.72	SD of log Data	0.6
SD	25.8		
Coefficient of Variation	0.458		
Skewness	-0.159		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.859	Shapiro Wilk Test Statistic	0.828
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	67.65	95% H-UCL	82.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	97.75
95% Adjusted-CLT UCL (Chen-1995)	66.68	97.5% Chebyshev (MVUE) UCL	114.9
95% Modified-t UCL (Johnson-1978)	67.61	99% Chebyshev (MVUE) UCL	148.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.143	Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.93		
MLE of Mean	56.34		
MLE of Standard Deviation	31.78		
nu star	100.6		
Approximate Chi Square Value (.05)	78.44	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	66.95
Adjusted Chi Square Value	76.21	95% Jackknife UCL	67.65
		95% Standard Bootstrap UCL	66.72
Anderson-Darling Test Statistic	0.897	95% Bootstrap-t UCL	67.44
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	66.58
Kolmogorov-Smirnov Test Statistic	0.223	95% Percentile Bootstrap UCL	66.81
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	66.17
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	84.46
		97.5% Chebyshev(Mean, Sd) UCL	96.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	120.5
95% Approximate Gamma UCL	72.24		
95% Adjusted Gamma UCL	74.35		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	84.46
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics
Minimum	-0.0098 Log Statistics Not Available
Maximum	0.0212
Mean	0.00569
Median	0.00569
SD	0.00567
Coefficient of Variation	0.997
Skewness	5.32E-16

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.511 Not Available
Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.00817	95% H-UCL N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)
95% Student's-t UCL	0.00817	95% Adjusted-CLT UCL (Chen 1995) 0.00801
		95% Modified-t UCL (Johnson-1978) 0.00817

Gamma Distribution Test Data Distribution
 Gamma Statistics Not Available Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use		
Use 95% Chebyshev (Mean, Sd) UCL	0.0119	95% CLT UCL 0.00801
		95% Jackknife UCL 0.00817
		95% Standard Bootstrap UCL N/A
		95% Bootstrap-t UCL N/A
		95% Hall's Bootstrap UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% Chebyshev(Mean, Sd) UCL 0.0119
		97.5% Chebyshev(Mean, Sd) UCL 0.0145
		99% Chebyshev(Mean, Sd) UCL 0.0198

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics

Minimum	0.089	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-2.419
Mean	8.551	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.693
SD	3.339	SD of log Data	1.597
Coefficient of Variation	0.39		
Skewness	-2.409		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.483	Shapiro Wilk Test Statistic	0.419
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	90.21
95% Adjusted-CLT UCL (Chen-1995)	9.387	95% Chebyshev (MVUE) UCL	50.46
95% Modified-t UCL (Johnson-1978)	9.93	97.5% Chebyshev (MVUE) UCL	65.06
		99% Chebyshev (MVUE) UCL	93.75

Gamma Distribution Test

k star (bias corrected)	1.051	Data Distribution	
Theta Star	8.133	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.551		
MLE of Standard Deviation	8.339		
nu star	33.65		
Approximate Chi Square Value (.05)	21.38	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	9.924
Adjusted Chi Square Value	20.27	95% Jackknife UCL	10.01
		95% Standard Bootstrap UCL	9.886
Anderson-Darling Test Statistic	4.875	95% Bootstrap-t UCL	9.71
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	9.441
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	9.789
Kolmogorov-Smirnov 5% Critical Value	0.22	95% BCA Bootstrap UCL	9.608
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.19
		97.5% Chebyshev(Mean, Sd) UCL	13.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.86
95% Approximate Gamma UCL	13.46		
95% Adjusted Gamma UCL	14.19		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 16.86

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics

Minimum	5.53	Log-transformed Statistics	
Maximum	70.21	Minimum of Log Data	1.71
Mean	56.97	Maximum of Log Data	4.251
Median	65	Mean of log Data	3.867
SD	20.08	SD of log Data	0.805
Coefficient of Variation	0.353		
Skewness	-2.394		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.508	Shapiro Wilk Test Statistic	0.448
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	65.77	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	109.3
95% Adjusted-CLT UCL (Chen-1995)	62.01	95% Chebyshev (MVUE) UCL	125
95% Modified-t UCL (Johnson-1978)	65.27	97.5% Chebyshev (MVUE) UCL	151.3
		99% Chebyshev (MVUE) UCL	202.8

Gamma Distribution Test

k star (bias corrected)	2.489	Data Distribution	
Theta Star	22.89	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	56.97		
MLE of Standard Deviation	36.11		
nu star	79.64		
Approximate Chi Square Value (.05)	60.08	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	65.22
Adjusted Chi Square Value	58.15	95% Jackknife UCL	65.77
		95% Standard Bootstrap UCL	64.94
Anderson-Darling Test Statistic	4.382	95% Bootstrap-t UCL	63.52
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	62.66
Kolmogorov-Smirnov Test Statistic	0.452	95% Percentile Bootstrap UCL	64.47
Kolmogorov-Smirnov 5% Critical Value	0.217	95% BCA Bootstrap UCL	62.08
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.85
		97.5% Chebyshev(Mean, Sd) UCL	88.32
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.9
95% Approximate Gamma UCL	75.51		
95% Adjusted Gamma UCL	78.02		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 78.85
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics

Minimum	2.42	Minimum of Log Data	0.884
Maximum	10.3	Maximum of Log Data	2.332
Mean	9.48	Mean of log Data	2.209
Median	10	SD of log Data	0.354
SD	1.893		
Coefficient of Variation	0.2		
Skewness	-3.926		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.342	Shapiro Wilk Test Statistic	0.31
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.31	95% H-UCL	11.55
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.44
95% Adjusted-CLT UCL (Chen-1995)	9.762	97.5% Chebyshev (MVUE) UCL	15.08
95% Modified-t UCL (Johnson-1978)	10.23	99% Chebyshev (MVUE) UCL	18.3

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	10.31	Data Distribution	
Theta Star	0.92	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.48		
MLE of Standard Deviation	2.953		
nu star	329.8		
Approximate Chi Square Value (.05)	288.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	10.26
Adjusted Chi Square Value	284.3	95% Jackknife UCL	10.31
		95% Standard Bootstrap UCL	10.22
Anderson-Darling Test Statistic	5.083	95% Bootstrap-t UCL	10.06
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	9.956
Kolmogorov-Smirnov Test Statistic	0.475	95% Percentile Bootstrap UCL	10.01
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	9.959
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.54
		97.5% Chebyshev(Mean, Sd) UCL	12.44
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.19
95% Approximate Gamma UCL	10.83		
95% Adjusted Gamma UCL	11		

Potential UCL to Use Use 95% Student's-t UCL 10.31
 or 95% Modified-t UCL 10.23

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.455 Minimum of Log Data	-0.787
Maximum	1.3 Maximum of Log Data	0.262
Mean	0.878 Mean of log Data	-0.147
Median	0.878 SD of log Data	0.197
SD	0.154	
Coefficient of Variation	0.176	
Skewness	2.02E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.511 Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.945 95% H-UCL	0.964
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.069
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	1.151
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	1.312

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	24.82 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0354	
MLE of Mean	0.878	
MLE of Standard Deviation	0.176	
nu star	794.3	
Approximate Chi Square Value (.05)	729.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	0.941
Adjusted Chi Square Value	722.9 95% Jackknife UCL	0.945
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.212 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.736 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.462 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.215 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.046
	97.5% Chebyshev(Mean, Sd) UCL	1.118
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.261
95% Approximate Gamma UCL	0.955	
95% Adjusted Gamma UCL	0.964	

Potential UCL to Use Use 95% Student's-t UCL 0.945
 or 95% Modified-t UCL 0.945

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.44	Log-transformed Statistics	
Maximum	1.5	Minimum of Log Data	-0.821
Mean	0.783	Maximum of Log Data	0.405
Median	0.783	Mean of log Data	-0.272
SD	0.201	SD of log Data	0.233
Coefficient of Variation	0.256		
Skewness	2.335		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.54	Shapiro Wilk Test Statistic	0.609
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.862	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.864
95% Adjusted-CLT UCL (Chen-1995)	0.885	95% Chebyshev (MVUE) UCL	0.965
95% Modified-t UCL (Johnson-1978)	0.866	97.5% Chebyshev (MVUE) UCL	1.044
		99% Chebyshev (MVUE) UCL	1.2

Gamma Distribution Test

k star (bias corrected)	16.03	Data Distribution	
Theta Star	0.0488	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.783		
MLE of Standard Deviation	0.195		
nu star	609.2		
Approximate Chi Square Value (.05)	552.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	0.858
Adjusted Chi Square Value	548.3	95% Jackknife UCL	0.862
		95% Standard Bootstrap UCL	0.856
Anderson-Darling Test Statistic	3.914	95% Bootstrap-t UCL	0.89
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	1.264
Kolmogorov-Smirnov Test Statistic	0.417	95% Percentile Bootstrap UCL	0.861
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	0.887
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.983
		97.5% Chebyshev(Mean, Sd) UCL	1.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.24
95% Approximate Gamma UCL	0.862		
95% Adjusted Gamma UCL	0.869		

Potential UCL to Use

Use 95% Student's-t UCL	0.862
or 95% Modified-t UCL	0.866

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 13

Raw Statistics

Minimum	5.65	Log-transformed Statistics	
Maximum	14.4	Minimum of Log Data	1.732
Mean	9.216	Maximum of Log Data	2.667
Median	8.9	Mean of log Data	2.186
SD	2.44	SD of log Data	0.277
Coefficient of Variation	0.265		
Skewness	0.113		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Test Statistic	0.902
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.42
95% Adjusted-CLT UCL (Chen-1995)	10.15	95% Chebyshev (MVUE) UCL	11.81
95% Modified-t UCL (Johnson-1978)	10.19	97.5% Chebyshev (MVUE) UCL	12.92
		99% Chebyshev (MVUE) UCL	15.12

Gamma Distribution Test

k star (bias corrected)	12.19	Data Distribution	
Theta Star	0.756	Data appear Normal at 5% Significance Level	
MLE of Mean	9.216		
MLE of Standard Deviation	2.64		
nu star	463.2		
Approximate Chi Square Value (.05)	414.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	10.14
Adjusted Chi Square Value	410.2	95% Jackknife UCL	10.19
		95% Standard Bootstrap UCL	10.09
Anderson-Darling Test Statistic	0.86	95% Bootstrap-t UCL	10.16
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	10.14
Kolmogorov-Smirnov Test Statistic	0.256	95% Percentile Bootstrap UCL	10.07
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	10.17
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.66
		97.5% Chebyshev(Mean, Sd) UCL	12.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.79
95% Approximate Gamma UCL	10.3		
95% Adjusted Gamma UCL	10.41		

Potential UCL to Use

Use 95% Student's-t UCL 10.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.49	Minimum of Log Data	-0.713
Maximum	0.69	Maximum of Log Data	-0.371
Mean	0.58	Mean of log Data	-0.547
Median	0.58	SD of log Data	0.0708
SD	0.041		
Coefficient of Variation	0.0706		
Skewness	0.276		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.662	Shapiro Wilk Test Statistic	0.662
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.596	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.621
95% Adjusted-CLT UCL (Chen-1995)	0.596	97.5% Chebyshev (MVUE) UCL	0.639
95% Modified-t UCL (Johnson-1978)	0.596	99% Chebyshev (MVUE) UCL	0.674

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	178.2	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00325		
MLE of Mean	0.58		
MLE of Standard Deviation	0.0434		
nu star	6771		
Approximate Chi Square Value (.05)	6581	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	0.595
Adjusted Chi Square Value	6565	95% Jackknife UCL	0.596
		95% Standard Bootstrap UCL	0.595
Anderson-Darling Test Statistic	3.577	95% Bootstrap-t UCL	0.597
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	0.602
Kolmogorov-Smirnov Test Statistic	0.404	95% Percentile Bootstrap UCL	0.596
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	0.595
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.621
		97.5% Chebyshev(Mean, Sd) UCL	0.639
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.673
95% Approximate Gamma UCL	0.597		
95% Adjusted Gamma UCL	0.598		

Potential UCL to Use

Use 95% Student's-t UCL 0.596
or 95% Modified-t UCL 0.596

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	15.2 Minimum of Log Data	2.721
Maximum	85 Maximum of Log Data	4.443
Mean	52.34 Mean of log Data	3.807
Median	38.71 SD of log Data	0.594
SD	27.2	
Coefficient of Variation	0.52	
Skewness	0.218	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.819 Shapiro Wilk Test Statistic	0.86
Shapiro Wilk Critical Value	0.901 Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	63.16 95% H-UCL	72.04
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	86.16
95% Adjusted-CLT UCL (Chen-1995)	62.93 97.5% Chebyshev (MVUE) UCL	100.5
95% Modified-t UCL (Johnson-1978)	63.21 99% Chebyshev (MVUE) UCL	128.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.958 Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.69	
MLE of Mean	52.34	
MLE of Standard Deviation	30.43	
nu star	112.4	
Approximate Chi Square Value (.05)	88.93 Nonparametric Statistics	
Adjusted Level of Significance	0.0369 95% CLT UCL	62.6
Adjusted Chi Square Value	87.1 95% Jackknife UCL	63.16
	95% Standard Bootstrap UCL	62.42
Anderson-Darling Test Statistic	1.105 95% Bootstrap-t UCL	63.05
Anderson-Darling 5% Critical Value	0.747 95% Hall's Bootstrap UCL	62.46
Kolmogorov-Smirnov Test Statistic	0.244 95% Percentile Bootstrap UCL	62.62
Kolmogorov-Smirnov 5% Critical Value	0.2 95% BCA Bootstrap UCL	63.23
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	79.54
	97.5% Chebyshev(Mean, Sd) UCL	91.31
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	114.4
95% Approximate Gamma UCL	66.15	
95% Adjusted Gamma UCL	67.54	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 79.54

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 19

Raw Statistics

Minimum	134.4	Log-transformed Statistics	
Maximum	1030	Minimum of Log Data	4.901
Mean	458	Maximum of Log Data	6.937
Median	373	Mean of log Data	5.969
SD	271.8	SD of log Data	0.576
Coefficient of Variation	0.593		
Skewness	1.03		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.875	Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	566.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	612.8
95% Adjusted-CLT UCL (Chen-1995)	576.4	95% Chebyshev (MVUE) UCL	732.7
95% Modified-t UCL (Johnson-1978)	568.6	97.5% Chebyshev (MVUE) UCL	851.9
		99% Chebyshev (MVUE) UCL	1086

Gamma Distribution Test

k star (bias corrected)	2.837	Data Distribution	
Theta Star	161.5	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	458		
MLE of Standard Deviation	272		
nu star	107.8		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0369	Nonparametric Statistics	
Adjusted Chi Square Value	83.05	95% CLT UCL	560.6
		95% Jackknife UCL	566.2
		95% Standard Bootstrap UCL	558.2

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.403	95% Bootstrap-t UCL	600.3
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	572.9
Kolmogorov-Smirnov Test Statistic	0.132	95% Percentile Bootstrap UCL	562
Kolmogorov-Smirnov 5% Critical Value	0.2	95% BCA Bootstrap UCL	572.7
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	729.9
		97.5% Chebyshev(Mean, Sd) UCL	847.5
		99% Chebyshev(Mean, Sd) UCL	1079

Assuming Gamma Distribution

95% Approximate Gamma UCL	582
95% Adjusted Gamma UCL	594.5

Potential UCL to Use

Use 95% Approximate Gamma UCL 582

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 6

Raw Statistics

Minimum	0.01	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.605
Mean	7.731	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.067
SD	4.145	SD of log Data	2.443
Coefficient of Variation	0.536		
Skewness	-1.441		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.559	Shapiro Wilk Test Statistic	0.553
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.381	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1050
95% Adjusted-CLT UCL (Chen-1995)	8.96	95% Chebyshev (MVUE) UCL	143.3
95% Modified-t UCL (Johnson-1978)	9.328	97.5% Chebyshev (MVUE) UCL	189.7
		99% Chebyshev (MVUE) UCL	280.7

Gamma Distribution Test

k star (bias corrected)	0.564	Data Distribution	
Theta Star	13.72	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.731		
MLE of Standard Deviation	10.3		
nu star	21.42		
Approximate Chi Square Value (.05)	11.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	9.296
Adjusted Chi Square Value	11.29	95% Jackknife UCL	9.381
		95% Standard Bootstrap UCL	9.254
Anderson-Darling Test Statistic	4.909	95% Bootstrap-t UCL	9.073
Anderson-Darling 5% Critical Value	0.791	95% Hall's Bootstrap UCL	8.941
Kolmogorov-Smirnov Test Statistic	0.473	95% Percentile Bootstrap UCL	9.301
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL	8.95
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.88
		97.5% Chebyshev(Mean, Sd) UCL	13.67
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.19
95% Approximate Gamma UCL	13.91		
95% Adjusted Gamma UCL	14.67		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.19

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 7

Raw Statistics

Minimum	7.3	Minimum of Log Data	1.988
Maximum	65	Maximum of Log Data	4.174
Mean	52.42	Mean of log Data	3.72
Median	65	SD of log Data	0.882
SD	23.71		
Coefficient of Variation	0.452		
Skewness	-1.526		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.543	Shapiro Wilk Test Statistic	0.53
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	61.85	95% H-UCL	101.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	116.6
95% Adjusted-CLT UCL (Chen-1995)	59.33	97.5% Chebyshev (MVUE) UCL	141.3
95% Modified-t UCL (Johnson-1978)	61.53	99% Chebyshev (MVUE) UCL	190

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	1.924	Data Distribution	
Theta Star	27.24	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	52.42		
MLE of Standard Deviation	37.79		
nu star	73.13		
Approximate Chi Square Value (.05)	54.44	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	61.37
Adjusted Chi Square Value	53.03	95% Jackknife UCL	61.85
		95% Standard Bootstrap UCL	61.01
Anderson-Darling Test Statistic	4.694	95% Bootstrap-t UCL	60.16
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	59.52
Kolmogorov-Smirnov Test Statistic	0.44	95% Percentile Bootstrap UCL	61.07
Kolmogorov-Smirnov 5% Critical Value	0.201	95% BCA Bootstrap UCL	58.84
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	76.13
		97.5% Chebyshev(Mean, Sd) UCL	86.39
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.5
95% Approximate Gamma UCL	70.42		
95% Adjusted Gamma UCL	72.29		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 76.13

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 6

Raw Statistics

Minimum	0.02	Log-transformed Statistics	
Maximum	10.93	Minimum of Log Data	-3.912
Mean	8.474	Maximum of Log Data	2.392
Median		Mean of log Data	1.37
SD	3.764	10 SD of log Data	2.228
Coefficient of Variation	0.444		
Skewness	-2.026		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.477	Shapiro Wilk Test Statistic	0.459
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.971	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	543.9
95% Adjusted-CLT UCL (Chen-1995)	9.465	95% Chebyshev (MVUE) UCL	123.4
95% Modified-t UCL (Johnson-1978)	9.904	97.5% Chebyshev (MVUE) UCL	162.5
		99% Chebyshev (MVUE) UCL	239.2

Gamma Distribution Test

k star (bias corrected)	0.689	Data Distribution	
Theta Star	12.29	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.474		
MLE of Standard Deviation	10.21		
nu star	26.19		
Approximate Chi Square Value (.05)	15.53	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	9.894
Adjusted Chi Square Value	14.81	95% Jackknife UCL	9.971
		95% Standard Bootstrap UCL	9.877
Anderson-Darling Test Statistic	5.971	95% Bootstrap-t UCL	9.708
Anderson-Darling 5% Critical Value	0.778	95% Hall's Bootstrap UCL	9.562
Kolmogorov-Smirnov Test Statistic	0.543	95% Percentile Bootstrap UCL	9.621
Kolmogorov-Smirnov 5% Critical Value	0.206	95% BCA Bootstrap UCL	9.525
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.24
		97.5% Chebyshev(Mean, Sd) UCL	13.87
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.06
95% Approximate Gamma UCL	14.29		
95% Adjusted Gamma UCL	14.98		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.06

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.25	Minimum of Log Data	-1.386
Maximum	0.64	Maximum of Log Data	-0.446
Mean	0.353	Mean of log Data	-1.061
Median	0.353	SD of log Data	0.19
SD	0.0783		
Coefficient of Variation	0.222		
Skewness	2.733		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.527	Shapiro Wilk Test Statistic	0.605
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.384	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.381
95% Adjusted-CLT UCL (Chen-1995)	0.394	95% Chebyshev (MVUE) UCL	0.419
95% Modified-t UCL (Johnson-1978)	0.386	97.5% Chebyshev (MVUE) UCL	0.448
		99% Chebyshev (MVUE) UCL	0.506

Gamma Distribution Test

k star (bias corrected)	22.65	Data Distribution	
Theta Star	0.0156	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.353		
MLE of Standard Deviation	0.0741		
nu star	860.8		
Approximate Chi Square Value (.05)	793.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	0.382
Adjusted Chi Square Value	788.1	95% Jackknife UCL	0.384
		95% Standard Bootstrap UCL	0.382
Anderson-Darling Test Statistic	3.74	95% Bootstrap-t UCL	0.398
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	0.526
Kolmogorov-Smirnov Test Statistic	0.422	95% Percentile Bootstrap UCL	0.382
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	0.393
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.431
		97.5% Chebyshev(Mean, Sd) UCL	0.465
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.531
95% Approximate Gamma UCL	0.382		
95% Adjusted Gamma UCL	0.385		

Potential UCL to Use		Use 95% Student's-t UCL	0.384
		or 95% Modified-t UCL	0.386

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 5

Raw Statistics

Minimum	29.3	Log-transformed Statistics	
Maximum	46.5	Minimum of Log Data	3.378
Mean	36.23	Maximum of Log Data	3.839
Median	36.23	Mean of log Data	3.587
SD	3.059	SD of log Data	0.0816
Coefficient of Variation	0.0844		
Skewness	1.512		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.554	Shapiro Wilk Test Statistic	0.575
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	37.44	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	37.64	95% Chebyshev (MVUE) UCL	39.18
95% Modified-t UCL (Johnson-1978)	37.48	97.5% Chebyshev (MVUE) UCL	40.46
		99% Chebyshev (MVUE) UCL	42.97

Gamma Distribution Test

k star (bias corrected)	131.3	Data Distribution	
Theta Star	0.276	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	36.23		
MLE of Standard Deviation	3.162		
nu star	4988		
Approximate Chi Square Value (.05)	4825	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	37.38
Adjusted Chi Square Value	4811	95% Jackknife UCL	37.44
		95% Standard Bootstrap UCL	37.34
Anderson-Darling Test Statistic	4.191	95% Bootstrap-t UCL	37.61
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	40.56
Kolmogorov-Smirnov Test Statistic	0.405	95% Percentile Bootstrap UCL	37.48
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	37.65
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.28
		97.5% Chebyshev(Mean, Sd) UCL	40.61
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	43.21
95% Approximate Gamma UCL	37.45		
95% Adjusted Gamma UCL	37.56		

Potential UCL to Use Use 95% Student's-t UCL 37.44
or 95% Modified-t UCL 37.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.4	Minimum of Log Data -0.916
Maximum	0.97	Maximum of Log Data -0.0305
Mean	0.593	Mean of log Data -0.543
Median	0.593	SD of log Data 0.21
SD	0.133	
Coefficient of Variation	0.224	
Skewness	1.67	

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.631	Shapiro Wilk Test Statistic 0.676
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value 0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.659	95% H-UCL 0.664
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.744
95% Adjusted-CLT UCL (Chen-1995)	0.672	97.5% Chebyshev (MVUE) UCL 0.809
95% Modified-t UCL (Johnson-1978)	0.662	99% Chebyshev (MVUE) UCL 0.938

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	18.54	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.032	
MLE of Mean	0.593	
MLE of Standard Deviation	0.138	
nu star	482	
Approximate Chi Square Value (.05)	432.1	Nonparametric Statistics
Adjusted Level of Significance	0.0301	95% CLT UCL 0.654
Adjusted Chi Square Value	425.3	95% Jackknife UCL 0.659
		95% Standard Bootstrap UCL 0.652
Anderson-Darling Test Statistic	2.355	95% Bootstrap-t UCL 0.679
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL 1.002
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL 0.651
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL 0.665
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.754
		97.5% Chebyshev(Mean, Sd) UCL 0.824
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.961
95% Approximate Gamma UCL	0.662	
95% Adjusted Gamma UCL	0.672	

Potential UCL to Use

Use 95% Student's-t UCL	0.659
or 95% Modified-t UCL	0.662

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 10

Raw Statistics

Minimum	6.1	Log-transformed Statistics	
Maximum	14.9	Minimum of Log Data	1.808
Mean	8.927	Maximum of Log Data	2.701
Median	8.927	Mean of log Data	2.154
SD	2.549	SD of log Data	0.272
Coefficient of Variation	0.286		
Skewness	0.99		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.37
95% Adjusted-CLT UCL (Chen-1995)	10.3	95% Chebyshev (MVUE) UCL	11.87
95% Modified-t UCL (Johnson-1978)	10.22	97.5% Chebyshev (MVUE) UCL	13.15
		99% Chebyshev (MVUE) UCL	15.66

Gamma Distribution Test

k star (bias corrected)	11.15	Data Distribution	
Theta Star	0.8	Data appear Normal at 5% Significance Level	
MLE of Mean	8.927		
MLE of Standard Deviation	2.673		
nu star	290		
Approximate Chi Square Value (.05)	251.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.09
Adjusted Chi Square Value	246.4	95% Jackknife UCL	10.19
		95% Standard Bootstrap UCL	10.06
Anderson-Darling Test Statistic	0.388	95% Bootstrap-t UCL	10.49
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	10.61
Kolmogorov-Smirnov Test Statistic	0.152	95% Percentile Bootstrap UCL	10.05
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	10.32
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.01
		97.5% Chebyshev(Mean, Sd) UCL	13.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.96
95% Approximate Gamma UCL	10.29		
95% Adjusted Gamma UCL	10.5		

Potential UCL to Use Use 95% Student's-t UCL 10.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.54	Minimum of Log Data	-0.616
Maximum	0.88	Maximum of Log Data	-0.128
Mean	0.657	Mean of log Data	-0.427
Median	0.657	SD of log Data	0.114
SD	0.079		
Coefficient of Variation	0.12		
Skewness	1.666		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.664
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.696	95% H-UCL	0.696
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.747
95% Adjusted-CLT UCL (Chen-1995)	0.704	97.5% Chebyshev (MVUE) UCL	0.786
95% Modified-t UCL (Johnson-1978)	0.697	99% Chebyshev (MVUE) UCL	0.863

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	62.59	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0105		
MLE of Mean	0.657		
MLE of Standard Deviation	0.083		
nu star	1627		
Approximate Chi Square Value (.05)	1535	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	0.693
Adjusted Chi Square Value	1522	95% Jackknife UCL	0.696
		95% Standard Bootstrap UCL	0.692
Anderson-Darling Test Statistic	2.371	95% Bootstrap-t UCL	0.707
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	0.88
Kolmogorov-Smirnov Test Statistic	0.408	95% Percentile Bootstrap UCL	0.691
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	0.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.752
		97.5% Chebyshev(Mean, Sd) UCL	0.793
		99% Chebyshev(Mean, Sd) UCL	0.875
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.696		
95% Adjusted Gamma UCL	0.702		

Potential UCL to Use

Use 95% Student's-t UCL	0.696
or 95% Modified-t UCL	0.697

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	31.23 Minimum of Log Data	3.441
Maximum	85 Maximum of Log Data	4.443
Mean	62.66 Mean of log Data	4.078
Median	62.66 SD of log Data	0.373
SD	20.96	
Coefficient of Variation	0.334	
Skewness	-0.222	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.859 Shapiro Wilk Test Statistic	0.858
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	73.02 95% H-UCL	78.27
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	91.71
95% Adjusted-CLT UCL (Chen-1995)	71.84 97.5% Chebyshev (MVUE) UCL	104.2
95% Modified-t UCL (Johnson-1978)	72.96 99% Chebyshev (MVUE) UCL	128.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.646 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	9.429	
MLE of Mean	62.66	
MLE of Standard Deviation	24.31	
nu star	172.8	

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301	Nonparametric Statistics	
Adjusted Chi Square Value	139.6	95% CLT UCL	72.22
		95% Jackknife UCL	73.02
		95% Standard Bootstrap UCL	71.69

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.716	95% Bootstrap-t UCL	72.82
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	71.2

Kolmogorov-Smirnov Test Statistic

Kolmogorov-Smirnov Test Statistic	0.238	95% Percentile Bootstrap UCL	72.06
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	71.73

Data follow Appr. Gamma Distribution at 5% Significance Level

		95% Chebyshev(Mean, Sd) UCL	88
		97.5% Chebyshev(Mean, Sd) UCL	98.96
		99% Chebyshev(Mean, Sd) UCL	120.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	75.51
95% Adjusted Gamma UCL	77.57

Potential UCL to Use

Use 95% Approximate Gamma UCL 75.51

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	264.4 Minimum of Log Data	5.578
Maximum	822.1 Maximum of Log Data	6.712
Mean	613.8 Mean of log Data	6.369
Median	668 SD of log Data	0.355
SD	175.7	
Coefficient of Variation	0.286	
Skewness	-1.001	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test	0.891 Shapiro Wilk Test Statistic	0.813
Shapiro Wilk Test Statistic	0.866 Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	Data not Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level		

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	700.7 95% H-UCL	760.3
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	888.2
95% Adjusted-CLT UCL (Chen-1995)	679.5 97.5% Chebyshev (MVUE) UCL	1005
95% Modified-t UCL (Johnson-1978)	698.4 99% Chebyshev (MVUE) UCL	1234

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.835 Data appear Normal at 5% Significance Level	
Theta Star	78.35	
MLE of Mean	613.8	
MLE of Standard Deviation	219.3	
nu star	203.7	
Approximate Chi Square Value (.05)	171.7 Nonparametric Statistics	
Adjusted Level of Significance	0.0301 95% CLT UCL	694
Adjusted Chi Square Value	167.5 95% Jackknife UCL	700.7
	95% Standard Bootstrap UCL	690.4
Anderson-Darling Test Statistic	0.892 95% Bootstrap-t UCL	687.5
Anderson-Darling 5% Critical Value	0.734 95% Hall's Bootstrap UCL	681.9
Kolmogorov-Smirnov Test Statistic	0.234 95% Percentile Bootstrap UCL	687.2
Kolmogorov-Smirnov 5% Critical Value	0.237 95% BCA Bootstrap UCL	677.3
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	826.3
	97.5% Chebyshev(Mean, Sd) UCL	918.2
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1099
95% Approximate Gamma UCL	728.3	
95% Adjusted Gamma UCL	746.5	

Potential UCL to Use Use 95% Student's-t UCL 700.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.0131 Minimum of Log Data	-4.335
Maximum	10 Maximum of Log Data	2.303
Mean	6.997 Mean of log Data	0.789
Median	10 SD of log Data	2.681
SD	4.174	
Coefficient of Variation	0.597	
Skewness	-1.122	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.7 Shapiro Wilk Test Statistic	0.59
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.06	95% H-UCL	10168
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	157.6
95% Adjusted-CLT UCL (Chen-1995)	8.516	97.5% Chebyshev (MVUE) UCL	210.2
95% Modified-t UCL (Johnson-1978)	9	99% Chebyshev (MVUE) UCL	313.6

Gamma Distribution Test

k star (bias corrected)	0.469	Data Distribution	
Theta Star	14.93	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	6.997		
MLE of Standard Deviation	10.22		
nu star	12.18		
Approximate Chi Square Value (.05)	5.348	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	8.901
Adjusted Chi Square Value	4.718	95% Jackknife UCL	9.06
		95% Standard Bootstrap UCL	8.875
Anderson-Darling Test Statistic	2.869	95% Bootstrap-t UCL	8.666
Anderson-Darling 5% Critical Value	0.787	95% Hall's Bootstrap UCL	8.511
Kolmogorov-Smirnov Test Statistic	0.442	95% Percentile Bootstrap UCL	8.764
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	8.524
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.04
		97.5% Chebyshev(Mean, Sd) UCL	14.23
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.52
95% Approximate Gamma UCL	15.94		
95% Adjusted Gamma UCL	18.07		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 18.52

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	0.03 Minimum of Log Data	-3.507
Maximum	13.91 Maximum of Log Data	2.633
Mean	9.745 Mean of log Data	1.9
Median	10 SD of log Data	1.628
SD	3.153	
Coefficient of Variation	0.324	
Skewness	-2.612	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.608 Shapiro Wilk Test Statistic	0.362
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	11.3 95% H-UCL	166.1
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	66.36
95% Adjusted-CLT UCL (Chen-1995)	10.51 97.5% Chebyshev (MVUE) UCL	86.08
95% Modified-t UCL (Johnson-1978)	11.2 99% Chebyshev (MVUE) UCL	124.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.184 Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.23	
MLE of Mean	9.745	
MLE of Standard Deviation	8.956	
nu star	30.79	
Approximate Chi Square Value (.05)	19.11 Nonparametric Statistics	
Adjusted Level of Significance	0.0301 95% CLT UCL	11.18
Adjusted Chi Square Value	17.81 95% Jackknife UCL	11.3
	95% Standard Bootstrap UCL	11.13

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.846 95% Bootstrap-t UCL	10.85
Anderson-Darling 5% Critical Value	0.751 95% Hall's Bootstrap UCL	10.71
Kolmogorov-Smirnov Test Statistic	0.532 95% Percentile Bootstrap UCL	10.89
Kolmogorov-Smirnov 5% Critical Value	0.241 95% BCA Bootstrap UCL	10.67
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	13.56
	97.5% Chebyshev(Mean, Sd) UCL	15.21
	99% Chebyshev(Mean, Sd) UCL	18.45

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.7	
95% Adjusted Gamma UCL	16.84	

Potential UCL to Use

	Use 99% Chebyshev (Mean, Sd) UCL	18.45
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	3.65 Minimum of Log Data	1.295
Maximum	33.64 Maximum of Log Data	3.516
Mean	16.67 Mean of log Data	2.622
Median	20 SD of log Data	0.741
SD	8.396	
Coefficient of Variation	0.504	
Skewness	-0.191	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.817 Shapiro Wilk Test Statistic	0.717
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	20.82 95% H-UCL	30.45
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	34.26
95% Adjusted-CLT UCL (Chen-1995)	20.37 97.5% Chebyshev (MVUE) UCL	41.45
95% Modified-t UCL (Johnson-1978)	20.8 99% Chebyshev (MVUE) UCL	55.57

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.178 Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.655	
MLE of Mean	16.67	
MLE of Standard Deviation	11.3	
nu star	56.63	
Approximate Chi Square Value (.05)	40.33 Nonparametric Statistics	
Adjusted Level of Significance	0.0301 95% CLT UCL	20.5
Adjusted Chi Square Value	38.38 95% Jackknife UCL	20.82
	95% Standard Bootstrap UCL	20.28
Anderson-Darling Test Statistic	1.734 95% Bootstrap-t UCL	20.53
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	20.84
Kolmogorov-Smirnov Test Statistic	0.349 95% Percentile Bootstrap UCL	20.3
Kolmogorov-Smirnov 5% Critical Value	0.239 95% BCA Bootstrap UCL	20.23
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	26.82
	97.5% Chebyshev(Mean, Sd) UCL	31.21
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	39.84
95% Approximate Gamma UCL	23.41	
95% Adjusted Gamma UCL	24.6	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 26.82

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.91	Minimum of Log Data	-0.0943
Maximum	1.42	Maximum of Log Data	0.351
Mean	1.183	Mean of log Data	0.165
Median	1.183	SD of log Data	0.0926
SD	0.105		
Coefficient of Variation	0.0887		
Skewness	-0.607		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.617	Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.235	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	1.226	95% Chebyshev (MVUE) UCL	1.316
95% Modified-t UCL (Johnson-1978)	1.234	97.5% Chebyshev (MVUE) UCL	1.374
		99% Chebyshev (MVUE) UCL	1.486

Gamma Distribution Test

k star (bias corrected)	100.6	Data Distribution	
Theta Star	0.0118	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.183		
MLE of Standard Deviation	0.118		
nu star	2615		
Approximate Chi Square Value (.05)	2497	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	1.231
Adjusted Chi Square Value	2480	95% Jackknife UCL	1.235
		95% Standard Bootstrap UCL	1.23
Anderson-Darling Test Statistic	2.741	95% Bootstrap-t UCL	1.226
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	1.237
Kolmogorov-Smirnov Test Statistic	0.435	95% Percentile Bootstrap UCL	1.225
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	1.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.31
		97.5% Chebyshev(Mean, Sd) UCL	1.365
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.473
95% Approximate Gamma UCL	1.239		
95% Adjusted Gamma UCL	1.247		

Potential UCL to Use	Use 95% Student's-t UCL	1.235
	or 95% Modified-t UCL	1.234

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	25.6	Minimum of Log Data	3.243
Maximum	42.5	Maximum of Log Data	3.75
Mean	33.77	Mean of log Data	3.515
Median	33.77	SD of log Data	0.104
SD	3.456		
Coefficient of Variation	0.102		
Skewness	0.289		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.597	Shapiro Wilk Test Statistic	0.593
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	35.47	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	35.62
95% Adjusted-CLT UCL (Chen-1995)	35.43	95% Chebyshev (MVUE) UCL	38.02
95% Modified-t UCL (Johnson-1978)	35.49	97.5% Chebyshev (MVUE) UCL	39.85
		99% Chebyshev (MVUE) UCL	43.46

Gamma Distribution Test

k star (bias corrected)	78.58	Data Distribution	
Theta Star	0.43	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	33.77		
MLE of Standard Deviation	3.809		
nu star	2043		
Approximate Chi Square Value (.05)	1939	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	35.34
Adjusted Chi Square Value	1925	95% Jackknife UCL	35.47
		95% Standard Bootstrap UCL	35.28
Anderson-Darling Test Statistic	2.883	95% Bootstrap-t UCL	35.35
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	36.09
Kolmogorov-Smirnov Test Statistic	0.41	95% Percentile Bootstrap UCL	35.11
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	35.11
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	37.94
		97.5% Chebyshev(Mean, Sd) UCL	39.75
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	43.3
95% Approximate Gamma UCL	35.58		
95% Adjusted Gamma UCL	35.84		

Potential UCL to Use	Use 95% Student's-t UCL	35.47
	or 95% Modified-t UCL	35.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.46	Minimum of Log Data -0.777
Maximum	0.69	Maximum of Log Data -0.371
Mean	0.575	Mean of log Data -0.556
Median	0.575	SD of log Data 0.072
SD	0.0407	
Coefficient of Variation	0.0707	
Skewness	2.29E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.494	Shapiro Wilk Test Statistic 0.489
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value 0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.592	95% H-UCL N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.619
95% Adjusted-CLT UCL (Chen-1995)	0.591	97.5% Chebyshev (MVUE) UCL 0.638
95% Modified-t UCL (Johnson-1978)	0.592	99% Chebyshev (MVUE) UCL 0.675

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	171.7	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.00335	
MLE of Mean	0.575	
MLE of Standard Deviation	0.0439	
nu star	5836	
Approximate Chi Square Value (.05)	5660	Nonparametric Statistics
Adjusted Level of Significance	0.0346	95% CLT UCL 0.591
Adjusted Chi Square Value	5641	95% Jackknife UCL 0.592
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	4.552	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.45	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.618
		97.5% Chebyshev(Mean, Sd) UCL 0.637
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.673
95% Approximate Gamma UCL	0.593	
95% Adjusted Gamma UCL	0.595	

Potential UCL to Use	Use 95% Student's-t UCL	0.592
	or 95% Modified-t UCL	0.592

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Arsenic

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

Minimum	8.46	Log-transformed Statistics	
Maximum	28.55	Minimum of Log Data	2.135
Mean	12.55	Maximum of Log Data	3.352
Median	12.55	Mean of log Data	2.489
SD	4.447	SD of log Data	0.268
Coefficient of Variation	0.354		
Skewness	3.168		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.763
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	14.43	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.13
95% Adjusted-CLT UCL (Chen-1995)	15.21	95% Chebyshev (MVUE) UCL	16.03
95% Modified-t UCL (Johnson-1978)	14.57	97.5% Chebyshev (MVUE) UCL	17.58
		99% Chebyshev (MVUE) UCL	20.61

Gamma Distribution Test

k star (bias corrected)	10.45	Data Distribution	
Theta Star	1.2	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	12.55		
MLE of Standard Deviation	3.881		
nu star	355.4		
Approximate Chi Square Value (.05)	312.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	14.32
Adjusted Chi Square Value	308.6	95% Jackknife UCL	14.43
		95% Standard Bootstrap UCL	14.24
Anderson-Darling Test Statistic	1.691	95% Bootstrap-t UCL	16.33
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	22.3
Kolmogorov-Smirnov Test Statistic	0.345	95% Percentile Bootstrap UCL	14.56
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	15.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17.25
		97.5% Chebyshev(Mean, Sd) UCL	19.28
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	23.28
95% Approximate Gamma UCL	14.26		
95% Adjusted Gamma UCL	14.45		

Potential UCL to Use

Use 95% Student's-t UCL	14.43
or 95% Modified-t UCL	14.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics
Minimum	-0.04 Log Statistics Not Available
Maximum	0.327
Mean	0.165
Median	0.165
SD	0.0662
Coefficient of Variation	0.402
Skewness	-1.032

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.55 Not Available
Shapiro Wilk Critical Value	0.892

Data not Normal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.193 95% H-UCL	N/A
Assuming Normal Distribution	95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.193 95% Adjusted-CLT UCL (Chen 1995)	0.187
	95% Modified-t UCL (Johnson-1978)	0.192

Gamma Distribution Test	Data Distribution
Gamma Statistics Not Available	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use			
Use 95% Chebyshev (Mean, Sd) UCL	0.235	95% CLT UCL	0.191
		95% Jackknife UCL	0.193
		95% Standard Bootstrap UCL	0.191
		95% Bootstrap-t UCL	0.188
		95% Hall's Bootstrap UCL	0.193
		95% Percentile Bootstrap UCL	0.189
		95% BCA Bootstrap UCL	0.186
		95% Chebyshev(Mean, Sd) UCL	0.235
		97.5% Chebyshev(Mean, Sd) UCL	0.265
		99% Chebyshev(Mean, Sd) UCL	0.324

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 9

Raw Statistics

Minimum	11.6	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.451
Mean	46.38	Maximum of Log Data	4.443
Median	46.38	Mean of log Data	3.746
SD	18.16	SD of log Data	0.485
Coefficient of Variation	0.392		
Skewness	0.513		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.788	Shapiro Wilk Test Statistic	0.734
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	54.07	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	60.87
95% Adjusted-CLT UCL (Chen-1995)	54.21	95% Chebyshev (MVUE) UCL	72.29
95% Modified-t UCL (Johnson-1978)	54.16	97.5% Chebyshev (MVUE) UCL	83.12
		99% Chebyshev (MVUE) UCL	104.4

Gamma Distribution Test

k star (bias corrected)	4.689	Data Distribution	
Theta Star	9.891	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	46.38		
MLE of Standard Deviation	21.42		
nu star	159.4		
Approximate Chi Square Value (.05)	131.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	53.62
Adjusted Chi Square Value	128.6	95% Jackknife UCL	54.07
		95% Standard Bootstrap UCL	53.16
Anderson-Darling Test Statistic	1.976	95% Bootstrap-t UCL	55.31
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	60.69
Kolmogorov-Smirnov Test Statistic	0.28	95% Percentile Bootstrap UCL	53.43
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	53.76
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	65.57
		97.5% Chebyshev(Mean, Sd) UCL	73.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	90.2
95% Approximate Gamma UCL	56.34		
95% Adjusted Gamma UCL	57.51		

Potential UCL to Use

Use 95% Student's-t UCL	54.07
or 95% Modified-t UCL	54.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 7

Raw Statistics

Minimum	12.5	Log-transformed Statistics	
Maximum	66.58	Minimum of Log Data	2.526
Mean	58.05	Maximum of Log Data	4.198
Median	58.05	Mean of log Data	4.015
SD	12.17	SD of log Data	0.387
Coefficient of Variation	0.21		
Skewness	-3.629		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.49	Shapiro Wilk Test Statistic	0.375
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.21	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	72
95% Adjusted-CLT UCL (Chen-1995)	60.13	95% Chebyshev (MVUE) UCL	84.28
95% Modified-t UCL (Johnson-1978)	62.77	97.5% Chebyshev (MVUE) UCL	95.03
		99% Chebyshev (MVUE) UCL	116.1

Gamma Distribution Test

k star (bias corrected)	9.016	Data Distribution	
Theta Star	6.439	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.05		
MLE of Standard Deviation	19.33		
nu star	306.5		
Approximate Chi Square Value (.05)	267	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	62.91
Adjusted Chi Square Value	263.1	95% Jackknife UCL	63.21
		95% Standard Bootstrap UCL	62.63
Anderson-Darling Test Statistic	4.10E+00	95% Bootstrap-t UCL	61.46
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	61.2
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	61.74
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	61.18
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	70.92
		97.5% Chebyshev(Mean, Sd) UCL	76.49
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	87.43
95% Approximate Gamma UCL	66.65		
95% Adjusted Gamma UCL	67.63		

Potential UCL to Use

Use 95% Student's-t UCL	63.21
or 95% Modified-t UCL	62.77

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.0181 Minimum of Log Data	-4.012
Maximum	0.041 Maximum of Log Data	-3.194
Mean	0.032 Mean of log Data	-3.452
Median	0.032 SD of log Data	0.159
SD	0.00432	
Coefficient of Variation	0.135	
Skewness	-1.631	

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.565 Shapiro Wilk Test Statistic	0.507
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.0339 95% H-UCL	0.0344
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.0375
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	0.0398
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	0.0444

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	39.08 Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.20E-04	
MLE of Mean	0.032	
MLE of Standard Deviation	0.00512	
nu star	1329	
Approximate Chi Square Value (.05)	1245 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	0.0338
Adjusted Chi Square Value	1237 95% Jackknife UCL	0.0339
	95% Standard Bootstrap UCL	0.0337
Anderson-Darling Test Statistic	3.885 95% Bootstrap-t UCL	0.0336
Anderson-Darling 5% Critical Value	0.737 95% Hall's Bootstrap UCL	0.0337
Kolmogorov-Smirnov Test Statistic	0.46 95% Percentile Bootstrap UCL	0.0336
Kolmogorov-Smirnov 5% Critical Value	0.208 95% BCA Bootstrap UCL	0.0334
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.0366
	97.5% Chebyshev(Mean, Sd) UCL	0.0386
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.0425
95% Approximate Gamma UCL	0.0342	
95% Adjusted Gamma UCL	0.0344	

Potential UCL to Use Use 95% Student's-t UCL 0.0339
or 95% Modified-t UCL 0.0338

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.8	Minimum of Log Data	-0.223
Maximum	1.31	Maximum of Log Data	0.27
Mean	1.12	Mean of log Data	0.109
Median	1.12	SD of log Data	0.0967
SD	0.0986		
Coefficient of Variation	0.088		
Skewness	-1.755		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.563	Shapiro Wilk Test Statistic	0.528
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.162	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	1.148	95% Chebyshev (MVUE) UCL	1.235
95% Modified-t UCL (Johnson-1978)	1.16	97.5% Chebyshev (MVUE) UCL	1.285
		99% Chebyshev (MVUE) UCL	1.382

Gamma Distribution Test

k star (bias corrected)	100.2	Data Distribution	
Theta Star	0.0112	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.12		
MLE of Standard Deviation	0.112		
nu star	3408		
Approximate Chi Square Value (.05)	3273	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	1.159
Adjusted Chi Square Value	3260	95% Jackknife UCL	1.162
		95% Standard Bootstrap UCL	1.159
Anderson-Darling Test Statistic	3.811	95% Bootstrap-t UCL	1.155
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	1.155
Kolmogorov-Smirnov Test Statistic	0.453	95% Percentile Bootstrap UCL	1.154
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL	1.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.224
		97.5% Chebyshev(Mean, Sd) UCL	1.269
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.358
95% Approximate Gamma UCL	1.166		
95% Adjusted Gamma UCL	1.171		

Potential UCL to Use		Use 95% Student's-t UCL	1.162
		or 95% Modified-t UCL	1.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	5
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Raw Statistics

Minimum	4600	Minimum of Log Data	8.434
Maximum	13000	Maximum of Log Data	9.473
Mean	7983	Mean of log Data	8.969
Median	7983	SD of log Data	0.186
SD	1455		
Coefficient of Variation	0.182		
Skewness	1.057		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.561	Shapiro Wilk Test Statistic	0.57
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8503	95% H-UCL	8569
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9344
95% Adjusted-CLT UCL (Chen-1995)	8553	97.5% Chebyshev (MVUE) UCL	9931
95% Modified-t UCL (Johnson-1978)	8515	99% Chebyshev (MVUE) UCL	11084

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	27.41	Data do not follow a Discernable Distribution (0.05)	
Theta Star	291.3		
MLE of Mean	7983		
MLE of Standard Deviation	1525		
nu star	1261		
Approximate Chi Square Value (.05)	1179	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	8481
Adjusted Chi Square Value	1174	95% Jackknife UCL	8503
		95% Standard Bootstrap UCL	8464
Anderson-Darling Test Statistic	5.147	95% Bootstrap-t UCL	8534
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	8964
Kolmogorov-Smirnov Test Statistic	0.437	95% Percentile Bootstrap UCL	8511
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	8528
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9305
		97.5% Chebyshev(Mean, Sd) UCL	9877
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11001
95% Approximate Gamma UCL	8534		
95% Adjusted Gamma UCL	8575		

Potential UCL to Use

Use 95% Student's-t UCL	8503
or 95% Modified-t UCL	8515

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 15

Raw Statistics

	Log-transformed Statistics	
Minimum	3.2 Minimum of Log Data	1.163
Maximum	16 Maximum of Log Data	2.773
Mean	9.231 Mean of log Data	2.171
Median	10.54 SD of log Data	0.348
SD	2.791	
Coefficient of Variation	0.302	
Skewness	-0.0564	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.895 Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.23 95% H-UCL	10.69
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12.28
95% Adjusted-CLT UCL (Chen-1995)	10.18 97.5% Chebyshev (MVUE) UCL	13.58
95% Modified-t UCL (Johnson-1978)	10.23 99% Chebyshev (MVUE) UCL	16.13

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	8.573 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.077	
MLE of Mean	9.231	
MLE of Standard Deviation	3.153	
nu star	394.4	
Approximate Chi Square Value (.05)	349.3 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	10.19
Adjusted Chi Square Value	346.3 95% Jackknife UCL	10.23
	95% Standard Bootstrap UCL	10.16
Anderson-Darling Test Statistic	1.336 95% Bootstrap-t UCL	10.21
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	10.25
Kolmogorov-Smirnov Test Statistic	0.224 95% Percentile Bootstrap UCL	10.14
Kolmogorov-Smirnov 5% Critical Value	0.182 95% BCA Bootstrap UCL	10.15
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11.77
	97.5% Chebyshev(Mean, Sd) UCL	12.87
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	15.02
95% Approximate Gamma UCL	10.42	
95% Adjusted Gamma UCL	10.51	

Potential UCL to Use

Use 95% Student's-t UCL 10.23
or 95% Modified-t UCL 10.23

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics

Minimum	0.34	Log-transformed Statistics	
Maximum	0.92	Minimum of Log Data	-1.079
Mean	0.553	Maximum of Log Data	-0.0834
Median	0.553	Mean of log Data	-0.606
SD	0.0955	SD of log Data	0.163
Coefficient of Variation	0.173		
Skewness	2.122		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.483	Shapiro Wilk Test Statistic	0.523
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.587	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.587
95% Adjusted-CLT UCL (Chen-1995)	0.595	95% Chebyshev (MVUE) UCL	0.634
95% Modified-t UCL (Johnson-1978)	0.588	97.5% Chebyshev (MVUE) UCL	0.67
		99% Chebyshev (MVUE) UCL	0.739

Gamma Distribution Test

k star (bias corrected)	33.87	Data Distribution	
Theta Star	0.0163	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.553		
MLE of Standard Deviation	0.0949		
nu star	1558		
Approximate Chi Square Value (.05)	1467	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.585
Adjusted Chi Square Value	1461	95% Jackknife UCL	0.587
		95% Standard Bootstrap UCL	0.584
Anderson-Darling Test Statistic	5.633	95% Bootstrap-t UCL	0.594
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.778
Kolmogorov-Smirnov Test Statistic	0.435	95% Percentile Bootstrap UCL	0.588
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	0.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.639
		97.5% Chebyshev(Mean, Sd) UCL	0.677
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.751
95% Approximate Gamma UCL	0.587		
95% Adjusted Gamma UCL	0.589		

Potential UCL to Use

Use 95% Student's-t UCL 0.587
or 95% Modified-t UCL 0.588

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	-0.01	Log Statistics Not Available	
Maximum	0.348		
Mean	0.0853		
Median	0.0853		
SD	0.0648		
Coefficient of Variation	0.76		
Skewness	2.944		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.481	Not Available	
Shapiro Wilk Critical Value	0.914		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Student's-t UCL	0.108	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.108	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.116
		95% Modified-t UCL (Johnson-1978)	0.11

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.144	95% CLT UCL	0.107
		95% Jackknife UCL	0.108
		95% Standard Bootstrap UCL	0.107
		95% Bootstrap-t UCL	0.118
		95% Hall's Bootstrap UCL	0.218
		95% Percentile Bootstrap UCL	0.108
		95% BCA Bootstrap UCL	0.12
		95% Chebyshev(Mean, Sd) UCL	0.144
		97.5% Chebyshev(Mean, Sd) UCL	0.17
		99% Chebyshev(Mean, Sd) UCL	0.22

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

	Log-transformed Statistics	
Minimum	8.4 Minimum of Log Data	2.128
Maximum	85 Maximum of Log Data	4.443
Mean	50.47 Mean of log Data	3.761
Median	48.41 SD of log Data	0.656
SD	24.59	
Coefficient of Variation	0.487	
Skewness	0.12	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.897 Shapiro Wilk Test Statistic	0.833
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	59.28 95% H-UCL	71.72
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	86.2
95% Adjusted-CLT UCL (Chen-1995)	59.04 97.5% Chebyshev (MVUE) UCL	100.7
95% Modified-t UCL (Johnson-1978)	59.3 99% Chebyshev (MVUE) UCL	129.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.87 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	17.59	
MLE of Mean	50.47	
MLE of Standard Deviation	29.79	
nu star	132	
Approximate Chi Square Value (.05)	106.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	58.91
Adjusted Chi Square Value	104.8 95% Jackknife UCL	59.28
	95% Standard Bootstrap UCL	58.76
Anderson-Darling Test Statistic	0.933 95% Bootstrap-t UCL	59.8
Anderson-Darling 5% Critical Value	0.75 95% Hall's Bootstrap UCL	58.99
Kolmogorov-Smirnov Test Statistic	0.156 95% Percentile Bootstrap UCL	58.64
Kolmogorov-Smirnov 5% Critical Value	0.183 95% BCA Bootstrap UCL	58.86
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	72.82
	97.5% Chebyshev(Mean, Sd) UCL	82.49
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	101.5
95% Approximate Gamma UCL	62.58	
95% Adjusted Gamma UCL	63.57	

Potential UCL to Use

Use 95% Approximate Gamma UCL 62.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 23

Raw Statistics

		Log-transformed Statistics	
Minimum	8373	Minimum of Log Data	9.033
Maximum	46653	Maximum of Log Data	10.75
Mean	15643	Mean of log Data	9.594
Median	14655	SD of log Data	0.331
SD	7342		
Coefficient of Variation	0.469		
Skewness	3.631		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.594	Shapiro Wilk Test Statistic	0.849
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	18271	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17655
95% Adjusted-CLT UCL (Chen-1995)	19399	95% Chebyshev (MVUE) UCL	20200
95% Modified-t UCL (Johnson-1978)	18465	97.5% Chebyshev (MVUE) UCL	22249
		99% Chebyshev (MVUE) UCL	26275

Gamma Distribution Test

k star (bias corrected)	6.981	Data Distribution	
Theta Star	2241	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	15643		
MLE of Standard Deviation	5920		
nu star	321.1		
Approximate Chi Square Value (.05)	280.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	18161
Adjusted Chi Square Value	277.9	95% Jackknife UCL	18271
		95% Standard Bootstrap UCL	18091
Anderson-Darling Test Statistic	1.311	95% Bootstrap-t UCL	20850
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	28864
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	18420
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	20050
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22316
		97.5% Chebyshev(Mean, Sd) UCL	25203
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	30875
95% Approximate Gamma UCL	17901		
95% Adjusted Gamma UCL	18078		

Potential UCL to Use

Use 95% Student's-t UCL 18271
or 95% Modified-t UCL 18465

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 23

Raw Statistics

Minimum	125.3	Log-transformed Statistics	
Maximum	1130	Minimum of Log Data	4.831
Mean	387.6	Maximum of Log Data	7.03
Median	324.4	Mean of log Data	5.814
SD	243	SD of log Data	0.529
Coefficient of Variation	0.627		
Skewness	1.78		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.794	Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	474.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	482.3
95% Adjusted-CLT UCL (Chen-1995)	491	95% Chebyshev (MVUE) UCL	574.3
95% Modified-t UCL (Johnson-1978)	477.7	97.5% Chebyshev (MVUE) UCL	657.3
		99% Chebyshev (MVUE) UCL	820.4

Gamma Distribution Test

k star (bias corrected)	3.136	Data Distribution	
Theta Star	123.6	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	387.6		
MLE of Standard Deviation	218.9		
nu star	144.3		
Approximate Chi Square Value (.05)	117.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	470.9
Adjusted Chi Square Value	115.8	95% Jackknife UCL	474.6
		95% Standard Bootstrap UCL	471.1
Anderson-Darling Test Statistic	0.887	95% Bootstrap-t UCL	508.4
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	494.9
Kolmogorov-Smirnov Test Statistic	0.178	95% Percentile Bootstrap UCL	474.2
Kolmogorov-Smirnov 5% Critical Value	0.183	95% BCA Bootstrap UCL	496.1
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	608.5
		97.5% Chebyshev(Mean, Sd) UCL	704.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	891.8
95% Approximate Gamma UCL	475.8		
95% Adjusted Gamma UCL	483		

Potential UCL to Use

Use 95% Approximate Gamma UCL 475.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.0088 Minimum of Log Data	-4.733
Maximum	10 Maximum of Log Data	2.303
Mean	8.218 Mean of log Data	1.215
Median	10 SD of log Data	2.418
SD	3.852	
Coefficient of Variation	0.469	
Skewness	-1.83	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.482 Shapiro Wilk Test Statistic	0.483
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	9.597 95% H-UCL	729.5
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	163
95% Adjusted-CLT UCL (Chen-1995)	9.211 97.5% Chebyshev (MVUE) UCL	215.1
95% Modified-t UCL (Johnson-1978)	9.546 99% Chebyshev (MVUE) UCL	317.3

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.621 Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.23	
MLE of Mean	8.218	
MLE of Standard Deviation	10.43	
nu star	28.56	
Approximate Chi Square Value (.05)	17.37 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	9.539
Adjusted Chi Square Value	16.74 95% Jackknife UCL	9.597
	95% Standard Bootstrap UCL	9.466
Anderson-Darling Test Statistic	7.021 95% Bootstrap-t UCL	9.292
Anderson-Darling 5% Critical Value	0.789 95% Hall's Bootstrap UCL	9.199
Kolmogorov-Smirnov Test Statistic	0.509 95% Percentile Bootstrap UCL	9.472
Kolmogorov-Smirnov 5% Critical Value	0.19 95% BCA Bootstrap UCL	9.132
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11.72
	97.5% Chebyshev(Mean, Sd) UCL	13.23
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	16.21
95% Approximate Gamma UCL	13.52	
95% Adjusted Gamma UCL	14.03	

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 13.23
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 12

Raw Statistics

Minimum	7.5	Minimum of Log Data	2.015
Maximum	104	Maximum of Log Data	4.644
Mean	63.23	Mean of log Data	4.044
Median	65	SD of log Data	0.582
SD	20.15		
Coefficient of Variation	0.319		
Skewness	-1.241		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic	0.557
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.45	95% H-UCL	87.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	104.2
95% Adjusted-CLT UCL (Chen-1995)	68.98	97.5% Chebyshev (MVUE) UCL	120.3
95% Modified-t UCL (Johnson-1978)	70.26	99% Chebyshev (MVUE) UCL	152

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	4.381	Data Distribution	
Theta Star	14.43	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.23		
MLE of Standard Deviation	30.21		
nu star	201.5		
Approximate Chi Square Value (.05)	169.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	70.14
Adjusted Chi Square Value	167.6	95% Jackknife UCL	70.45
		95% Standard Bootstrap UCL	69.76
Anderson-Darling Test Statistic	3.727	95% Bootstrap-t UCL	69.44
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	69.23
Kolmogorov-Smirnov Test Statistic	0.332	95% Percentile Bootstrap UCL	69.91
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	69.09
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.54
		97.5% Chebyshev(Mean, Sd) UCL	89.47
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	105
95% Approximate Gamma UCL	75.1		
95% Adjusted Gamma UCL	76.05		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 81.54

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	0.038	Minimum of Log Data	-3.27
Maximum	12.35	Maximum of Log Data	2.514
Mean	9.002	Mean of log Data	1.605
Median		10 SD of log Data	1.928
SD	3.604		
Coefficient of Variation	0.4		
Skewness	-2.197		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.54	Shapiro Wilk Test Statistic	0.426
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.29	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	160.7
95% Adjusted-CLT UCL (Chen-1995)	9.87	95% Chebyshev (MVUE) UCL	84.8
95% Modified-t UCL (Johnson-1978)	10.23	97.5% Chebyshev (MVUE) UCL	110.1
		99% Chebyshev (MVUE) UCL	159.8

Gamma Distribution Test

k star (bias corrected)	0.878	Data Distribution	
Theta Star	10.25	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.002		
MLE of Standard Deviation	9.605		
nu star	40.4		
Approximate Chi Square Value (.05)	26.84	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	10.24
Adjusted Chi Square Value	26.04	95% Jackknife UCL	10.29
		95% Standard Bootstrap UCL	10.21
Anderson-Darling Test Statistic	7.015	95% Bootstrap-t UCL	10.02
Anderson-Darling 5% Critical Value	0.771	95% Hall's Bootstrap UCL	9.944
Kolmogorov-Smirnov Test Statistic	0.541	95% Percentile Bootstrap UCL	10.05
Kolmogorov-Smirnov 5% Critical Value	0.187	95% BCA Bootstrap UCL	9.939
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.28
		97.5% Chebyshev(Mean, Sd) UCL	13.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.48
95% Approximate Gamma UCL	13.55		
95% Adjusted Gamma UCL	13.97		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.28

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0073	Minimum of Log Data	-4.92
Maximum	0.073	Maximum of Log Data	-2.618
Mean	0.0242	Mean of log Data	-3.819
Median	0.0242	SD of log Data	0.465
SD	0.012		
Coefficient of Variation	0.496		
Skewness	2.964		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.477	Shapiro Wilk Test Statistic	0.579
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.0285	95% H-UCL	0.0296
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0349
95% Adjusted-CLT UCL (Chen-1995)	0.03	97.5% Chebyshev (MVUE) UCL	0.0395
95% Modified-t UCL (Johnson-1978)	0.0287	99% Chebyshev (MVUE) UCL	0.0486

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.622	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00523		
MLE of Mean	0.0242		
MLE of Standard Deviation	0.0113		
nu star	212.6		
Approximate Chi Square Value (.05)	179.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.0283
Adjusted Chi Square Value	177.7	95% Jackknife UCL	0.0285
		95% Standard Bootstrap UCL	0.0283
Anderson-Darling Test Statistic	5.109	95% Bootstrap-t UCL	0.0304
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.0487
Kolmogorov-Smirnov Test Statistic	0.427	95% Percentile Bootstrap UCL	0.0284
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	0.0299
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0351
		97.5% Chebyshev(Mean, Sd) UCL	0.0398
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0491
95% Approximate Gamma UCL	0.0286		
95% Adjusted Gamma UCL	0.0289		

Potential UCL to Use

Use 95% Student's-t UCL 0.0285
or 95% Modified-t UCL 0.0287

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	0.573 Minimum of Log Data	-0.557
Maximum	1.73 Maximum of Log Data	0.548
Mean	0.953 Mean of log Data	-0.0648
Median	0.953 SD of log Data	0.184
SD	0.195	
Coefficient of Variation	0.205	
Skewness	2.622	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.493 Shapiro Wilk Test Statistic	0.558
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.023 95% H-UCL	1.021
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.112
95% Adjusted-CLT UCL (Chen-1995)	1.044 97.5% Chebyshev (MVUE) UCL	1.181
95% Modified-t UCL (Johnson-1978)	1.027 99% Chebyshev (MVUE) UCL	1.317

Gamma Distribution Test

k star (bias corrected)	25.86 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0369	
MLE of Mean	0.953	
MLE of Standard Deviation	0.187	
nu star	1190	
Approximate Chi Square Value (.05)	1111 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	1.02
Adjusted Chi Square Value	1105 95% Jackknife UCL	1.023
	95% Standard Bootstrap UCL	1.019
Anderson-Darling Test Statistic	5.15 95% Bootstrap-t UCL	1.048
Anderson-Darling 5% Critical Value	0.742 95% Hall's Bootstrap UCL	1.38
Kolmogorov-Smirnov Test Statistic	0.432 95% Percentile Bootstrap UCL	1.022
Kolmogorov-Smirnov 5% Critical Value	0.181 95% BCA Bootstrap UCL	1.043
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.131
	97.5% Chebyshev(Mean, Sd) UCL	1.207
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.358
95% Approximate Gamma UCL	1.021	
95% Adjusted Gamma UCL	1.026	

Potential UCL to Use

Use 95% Student's-t UCL 1.023
or 95% Modified-t UCL 1.027

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	14.7 Minimum of Log Data	2.688
Maximum	47.5 Maximum of Log Data	3.861
Mean	28.85 Mean of log Data	3.347
Median	28.85 SD of log Data	0.185
SD	5.146	
Coefficient of Variation	0.178	
Skewness	1.266	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.501 Shapiro Wilk Test Statistic	0.506
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	30.69	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	30.96
95% Adjusted-CLT UCL (Chen-1995)	30.92	95% Chebyshev (MVUE) UCL	33.74
95% Modified-t UCL (Johnson-1978)	30.74	97.5% Chebyshev (MVUE) UCL	35.85
		99% Chebyshev (MVUE) UCL	39.99

Gamma Distribution Test

k star (bias corrected)	28.3	Data Distribution	
Theta Star	1.019	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	28.85		
MLE of Standard Deviation	5.423		
nu star	1302		
Approximate Chi Square Value (.05)	1219	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	30.62
Adjusted Chi Square Value	1213	95% Jackknife UCL	30.69
		95% Standard Bootstrap UCL	30.6
Anderson-Darling Test Statistic	5.582	95% Bootstrap-t UCL	30.8
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	32.61
Kolmogorov-Smirnov Test Statistic	0.436	95% Percentile Bootstrap UCL	30.67
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	30.84
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	33.53
		97.5% Chebyshev(Mean, Sd) UCL	35.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	39.53
95% Approximate Gamma UCL	30.81		
95% Adjusted Gamma UCL	30.96		

Potential UCL to Use

Use 95% Student's-t UCL 30.69
or 95% Modified-t UCL 30.74

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-05.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	5380	Minimum of Log Data	8.59
Maximum	15200	Maximum of Log Data	9.629
Mean	8705	Mean of log Data	9.055
Median	8705	SD of log Data	0.181
SD	1752		
Coefficient of Variation	0.201		
Skewness	2.489		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.533	Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9382	95% H-UCL	9369
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10236
95% Adjusted-CLT UCL (Chen-1995)	9582	97.5% Chebyshev (MVUE) UCL	10901
95% Modified-t UCL (Johnson-1978)	9419	99% Chebyshev (MVUE) UCL	12209

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	26.21	Data do not follow a Discernable Distribution (0.05)	
Theta Star	332.1		
MLE of Mean	8705		
MLE of Standard Deviation	1700		
nu star	1049		
Approximate Chi Square Value (.05)	974.4	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	9349
Adjusted Chi Square Value	968.7	95% Jackknife UCL	9382
		95% Standard Bootstrap UCL	9340
Anderson-Darling Test Statistic	4.074	95% Bootstrap-t UCL	9616
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	12804
Kolmogorov-Smirnov Test Statistic	0.426	95% Percentile Bootstrap UCL	9355
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	9609
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10413
		97.5% Chebyshev(Mean, Sd) UCL	11152
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12603
95% Approximate Gamma UCL	9368		
95% Adjusted Gamma UCL	9422		

Potential UCL to Use

Use 95% Student's-t UCL	9382
or 95% Modified-t UCL	9419

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	4 Minimum of Log Data	1.386
Maximum	13.45 Maximum of Log Data	2.599
Mean	8.758 Mean of log Data	2.128
Median	8.3 SD of log Data	0.307
SD	2.466	
Coefficient of Variation	0.282	
Skewness	-0.0692	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.937 Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	9.711 95% H-UCL	10.03
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	11.45
95% Adjusted-CLT UCL (Chen-1995)	9.655 97.5% Chebyshev (MVUE) UCL	12.6
95% Modified-t UCL (Johnson-1978)	9.709 99% Chebyshev (MVUE) UCL	14.87

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	10.32 Data appear Normal at 5% Significance Level	
Theta Star	0.849	
MLE of Mean	8.758	
MLE of Standard Deviation	2.726	
nu star	412.7	
Approximate Chi Square Value (.05)	366.6 Nonparametric Statistics	
Adjusted Level of Significance	0.038 95% CLT UCL	9.664
Adjusted Chi Square Value	363.2 95% Jackknife UCL	9.711
	95% Standard Bootstrap UCL	9.653
Anderson-Darling Test Statistic	0.649 95% Bootstrap-t UCL	9.668
Anderson-Darling 5% Critical Value	0.742 95% Hall's Bootstrap UCL	9.611
Kolmogorov-Smirnov Test Statistic	0.221 95% Percentile Bootstrap UCL	9.624
Kolmogorov-Smirnov 5% Critical Value	0.194 95% BCA Bootstrap UCL	9.647
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11.16
	97.5% Chebyshev(Mean, Sd) UCL	12.2
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	14.24
95% Approximate Gamma UCL	9.859	
95% Adjusted Gamma UCL	9.952	

Potential UCL to Use Use 95% Student's-t UCL 9.711

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.38	Minimum of Log Data	-0.968
Maximum	0.8	Maximum of Log Data	-0.223
Mean	0.6	Mean of log Data	-0.518
Median	0.6	SD of log Data	0.124
SD	0.0684		
Coefficient of Variation	0.114		
Skewness	-0.483		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.474	Shapiro Wilk Test Statistic	0.452
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.626	95% H-UCL	0.631
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.673
95% Adjusted-CLT UCL (Chen-1995)	0.623	97.5% Chebyshev (MVUE) UCL	0.704
95% Modified-t UCL (Johnson-1978)	0.626	99% Chebyshev (MVUE) UCL	0.766

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	62.54	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00959		
MLE of Mean	0.6		
MLE of Standard Deviation	0.0759		
nu star	2502		
Approximate Chi Square Value (.05)	2387	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	0.625
Adjusted Chi Square Value	2378	95% Jackknife UCL	0.626
		95% Standard Bootstrap UCL	0.625
Anderson-Darling Test Statistic	5.369	95% Bootstrap-t UCL	0.622
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	0.629
Kolmogorov-Smirnov Test Statistic	0.466	95% Percentile Bootstrap UCL	0.622
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	0.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.667
		97.5% Chebyshev(Mean, Sd) UCL	0.695
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.752
95% Approximate Gamma UCL	0.629		
95% Adjusted Gamma UCL	0.631		

Potential UCL to Use Use 95% Student's-t UCL 0.626
or 95% Modified-t UCL 0.626

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 14

Raw Statistics

Minimum	8.8	Minimum of Log Data	2.175
Maximum	85	Maximum of Log Data	4.443
Mean	54.25	Mean of log Data	3.857
Median	44.1	SD of log Data	0.595
SD	25.3		
Coefficient of Variation	0.466		
Skewness	0.0842		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.03	95% H-UCL	75.42
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	89.98
95% Adjusted-CLT UCL (Chen-1995)	63.67	97.5% Chebyshev (MVUE) UCL	104.7
95% Modified-t UCL (Johnson-1978)	64.05	99% Chebyshev (MVUE) UCL	133.7

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	3.276	Data Distribution	
Theta Star	16.56	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	54.25		
MLE of Standard Deviation	29.97		
nu star	131		
Approximate Chi Square Value (.05)	105.6	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	63.55
Adjusted Chi Square Value	103.8	95% Jackknife UCL	64.03
		95% Standard Bootstrap UCL	63.27
Anderson-Darling Test Statistic	1.044	95% Bootstrap-t UCL	64.4
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	63.07
Kolmogorov-Smirnov Test Statistic	0.217	95% Percentile Bootstrap UCL	63.38
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	63.54
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.91
		97.5% Chebyshev(Mean, Sd) UCL	89.58
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	110.5
95% Approximate Gamma UCL	67.32		
95% Adjusted Gamma UCL	68.49		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 78.91

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 20

Raw Statistics

	Log-transformed Statistics	
Minimum	113.8 Minimum of Log Data	4.734
Maximum	4146 Maximum of Log Data	8.33
Mean	525.1 Mean of log Data	5.759
Median	290.5 SD of log Data	0.852
SD	882.7	
Coefficient of Variation	1.681	
Skewness	4.013	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.439 Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	866.4 95% H-UCL	732.4
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	849.1
95% Adjusted-CLT UCL (Chen-1995)	1039 97.5% Chebyshev (MVUE) UCL	1024
95% Modified-t UCL (Johnson-1978)	895.9 99% Chebyshev (MVUE) UCL	1367

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.992 Data do not follow a Discernable Distribution (0.05)	
Theta Star	529.1	
MLE of Mean	525.1	
MLE of Standard Deviation	527.1	
nu star	39.69	
Approximate Chi Square Value (.05)	26.26 Nonparametric Statistics	
Adjusted Level of Significance	0.038 95% CLT UCL	849.8
Adjusted Chi Square Value	25.4 95% Jackknife UCL	866.4
	95% Standard Bootstrap UCL	836.9
Anderson-Darling Test Statistic	1.693 95% Bootstrap-t UCL	2003
Anderson-Darling 5% Critical Value	0.765 95% Hall's Bootstrap UCL	2095
Kolmogorov-Smirnov Test Statistic	0.24 95% Percentile Bootstrap UCL	892.8
Kolmogorov-Smirnov 5% Critical Value	0.199 95% BCA Bootstrap UCL	1095
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1385
	97.5% Chebyshev(Mean, Sd) UCL	1758
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2489
95% Approximate Gamma UCL	793.7	
95% Adjusted Gamma UCL	820.7	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1385

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0182	Minimum of Log Data	-4.006
Maximum		10 Maximum of Log Data	2.303
Mean	7.944	Mean of log Data	1.181
Median		10 SD of log Data	2.303
SD	4.062		
Coefficient of Variation	0.511		
Skewness	-1.605		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.52	Shapiro Wilk Test Statistic	0.525
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.514	95% H-UCL	601.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	120.2
95% Adjusted-CLT UCL (Chen-1995)	9.089	97.5% Chebyshev (MVUE) UCL	158.4
95% Modified-t UCL (Johnson-1978)	9.46	99% Chebyshev (MVUE) UCL	233.5

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.612	Data do not follow a Discernable Distribution (0.05)	
Theta Star	12.99		
MLE of Mean	7.944		
MLE of Standard Deviation	10.16		
nu star	24.47		
Approximate Chi Square Value (.05)	14.2	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	9.438
Adjusted Chi Square Value	13.59	95% Jackknife UCL	9.514
		95% Standard Bootstrap UCL	9.405
Anderson-Darling Test Statistic	5.551	95% Bootstrap-t UCL	9.2
Anderson-Darling 5% Critical Value	0.786	95% Hall's Bootstrap UCL	9.081
Kolmogorov-Smirnov Test Statistic	0.485	95% Percentile Bootstrap UCL	9.374
Kolmogorov-Smirnov 5% Critical Value	0.202	95% BCA Bootstrap UCL	9.006
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.9
		97.5% Chebyshev(Mean, Sd) UCL	13.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.98
95% Approximate Gamma UCL	13.68		
95% Adjusted Gamma UCL	14.3		

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCI 13.62
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	6.4 Minimum of Log Data	1.856
Maximum	75.64 Maximum of Log Data	4.326
Mean	59.87 Mean of log Data	3.985
Median	65 SD of log Data	0.614
SD	17.34	
Coefficient of Variation	0.29	
Skewness	-2.762	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.472 Shapiro Wilk Test Statistic	0.411
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	66.57 95% H-UCL	87.71
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	104.7
95% Adjusted-CLT UCL (Chen-1995)	63.68 97.5% Chebyshev (MVUE) UCL	122.2
95% Modified-t UCL (Johnson-1978)	66.17 99% Chebyshev (MVUE) UCL	156.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.129 Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.5	
MLE of Mean	59.87	
MLE of Standard Deviation	29.46	
nu star	165.2	
Approximate Chi Square Value (.05)	136.4 Nonparametric Statistics	
Adjusted Level of Significance	0.038 95% CLT UCL	66.24
Adjusted Chi Square Value	134.4 95% Jackknife UCL	66.57
	95% Standard Bootstrap UCL	66.07
Anderson-Darling Test Statistic	5.672 95% Bootstrap-t UCL	64.58
Anderson-Darling 5% Critical Value	0.745 95% Hall's Bootstrap UCL	64.32
Kolmogorov-Smirnov Test Statistic	0.465 95% Percentile Bootstrap UCL	65.55
Kolmogorov-Smirnov 5% Critical Value	0.195 95% BCA Bootstrap UCL	64.82
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	76.76
	97.5% Chebyshev(Mean, Sd) UCL	84.07
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	98.44
95% Approximate Gamma UCL	72.46	
95% Adjusted Gamma UCL	73.58	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 76.76

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	0.043	Minimum of Log Data	-3.147
Maximum	15.49	Maximum of Log Data	2.74
Mean	8.983	Mean of log Data	1.582
Median		10 SD of log Data	1.887
SD	4.054		
Coefficient of Variation	0.451		
Skewness	-1.567		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.653	Shapiro Wilk Test Statistic	0.489
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.55	95% H-UCL	170.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	76.71
95% Adjusted-CLT UCL (Chen-1995)	10.13	97.5% Chebyshev (MVUE) UCL	99.72
95% Modified-t UCL (Johnson-1978)	10.5	99% Chebyshev (MVUE) UCL	144.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.839	Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.71		
MLE of Mean	8.983		
MLE of Standard Deviation	9.809		
nu star	33.54		
Approximate Chi Square Value (.05)	21.3	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	10.47
Adjusted Chi Square Value	20.53	95% Jackknife UCL	10.55
		95% Standard Bootstrap UCL	10.45
Anderson-Darling Test Statistic	5.349	95% Bootstrap-t UCL	10.26
Anderson-Darling 5% Critical Value	0.77	95% Hall's Bootstrap UCL	10.17
Kolmogorov-Smirnov Test Statistic	0.514	95% Percentile Bootstrap UCL	10.35
Kolmogorov-Smirnov 5% Critical Value	0.2	95% BCA Bootstrap UCL	10.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.93
		97.5% Chebyshev(Mean, Sd) UCL	14.64
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18
95% Approximate Gamma UCL	14.15		
95% Adjusted Gamma UCL	14.68		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0083	Minimum of Log Data	-4.791
Maximum	0.778	Maximum of Log Data	-0.251
Mean	0.307	Mean of log Data	-1.426
Median	0.307	SD of log Data	1.009
SD	0.146		
Coefficient of Variation	0.474		
Skewness	1.054		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.598	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.364	95% H-UCL	0.738
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.811
95% Adjusted-CLT UCL (Chen-1995)	0.369	97.5% Chebyshev (MVUE) UCL	0.995
95% Modified-t UCL (Johnson-1978)	0.365	99% Chebyshev (MVUE) UCL	1.356

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.885	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.163		
MLE of Mean	0.307		
MLE of Standard Deviation	0.224		
nu star	75.4		
Approximate Chi Square Value (.05)	56.4	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	0.361
Adjusted Chi Square Value	55.1	95% Jackknife UCL	0.364
		95% Standard Bootstrap UCL	0.359
Anderson-Darling Test Statistic	4.766	95% Bootstrap-t UCL	0.367
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	0.416
Kolmogorov-Smirnov Test Statistic	0.49	95% Percentile Bootstrap UCL	0.361
Kolmogorov-Smirnov 5% Critical Value	0.196	95% BCA Bootstrap UCL	0.369
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.45
		97.5% Chebyshev(Mean, Sd) UCL	0.511
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.632
95% Approximate Gamma UCL	0.411		
95% Adjusted Gamma UCL	0.421		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.45

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 4

Raw Statistics

Minimum	0.83	Log-transformed Statistics	
Maximum	1.38	Minimum of Log Data	-0.186
Mean	1.077	Maximum of Log Data	0.322
Median	1.077	Mean of log Data	0.0706
SD	0.0906	SD of log Data	0.0834
Coefficient of Variation	0.0842		
Skewness	0.999		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.497	Shapiro Wilk Test Statistic	0.504
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.112	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	1.115	95% Chebyshev (MVUE) UCL	1.164
95% Modified-t UCL (Johnson-1978)	1.112	97.5% Chebyshev (MVUE) UCL	1.202
		99% Chebyshev (MVUE) UCL	1.277

Gamma Distribution Test

k star (bias corrected)	128.9	Data Distribution	
Theta Star	0.00836	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.077		
MLE of Standard Deviation	0.0948		
nu star	5154		
Approximate Chi Square Value (.05)	4989	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	1.11
Adjusted Chi Square Value	4976	95% Jackknife UCL	1.112
		95% Standard Bootstrap UCL	1.109
Anderson-Darling Test Statistic	5.012	95% Bootstrap-t UCL	1.113
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	1.146
Kolmogorov-Smirnov Test Statistic	0.439	95% Percentile Bootstrap UCL	1.113
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	1.11
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.165
		97.5% Chebyshev(Mean, Sd) UCL	1.203
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.278
95% Approximate Gamma UCL	1.112		
95% Adjusted Gamma UCL	1.115		

Potential UCL to Use Use 95% Student's-t UCL 1.112
 or 95% Modified-t UCL 1.112

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	17.5 Minimum of Log Data	2.862
Maximum	45.2 Maximum of Log Data	3.811
Mean	29.9 Mean of log Data	3.383
Median	29.9 SD of log Data	0.181
SD	5.176	
Coefficient of Variation	0.173	
Skewness	0.489	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.638 Shapiro Wilk Test Statistic	0.632
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	31.9 95% H-UCL	32.23
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	35.22
95% Adjusted-CLT UCL (Chen-1995)	31.94 97.5% Chebyshev (MVUE) UCL	37.51
95% Modified-t UCL (Johnson-1978)	31.92 99% Chebyshev (MVUE) UCL	42.01

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	28.8 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.038	
MLE of Mean	29.9	
MLE of Standard Deviation	5.571	
nu star	1152	
Approximate Chi Square Value (.05)	1074 Nonparametric Statistics	
Adjusted Level of Significance	0.038 95% CLT UCL	31.8
Adjusted Chi Square Value	1068 95% Jackknife UCL	31.9
	95% Standard Bootstrap UCL	31.77
Anderson-Darling Test Statistic	3.946 95% Bootstrap-t UCL	31.99
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	33.03
Kolmogorov-Smirnov Test Statistic	0.423 95% Percentile Bootstrap UCL	31.74
Kolmogorov-Smirnov 5% Critical Value	0.193 95% BCA Bootstrap UCL	31.74
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	34.95
	97.5% Chebyshev(Mean, Sd) UCL	37.13
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	41.42
95% Approximate Gamma UCL	32.07	
95% Adjusted Gamma UCL	32.24	

Potential UCL to Use Use 95% Student's-t UCL 31.9
or 95% Modified-t UCL 31.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-06.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	118.8	Log-transformed Statistics	
Maximum	2807	Minimum of Log Data	4.778
Mean	823.8	Maximum of Log Data	7.94
Median	823.8	Mean of log Data	6.329
SD	767.4	SD of log Data	0.954
Coefficient of Variation	0.932		
Skewness	1.786		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.792	Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1222	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1996
95% Adjusted-CLT UCL (Chen-1995)	1310	95% Chebyshev (MVUE) UCL	1915
95% Modified-t UCL (Johnson-1978)	1241	97.5% Chebyshev (MVUE) UCL	2380
		99% Chebyshev (MVUE) UCL	3294

Gamma Distribution Test

k star (bias corrected)	1.138	Data Distribution	
Theta Star	723.9	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	823.8		
MLE of Standard Deviation	772.2		
nu star	27.31		
Approximate Chi Square Value (.05)	16.39	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1188
Adjusted Chi Square Value	15.11	95% Jackknife UCL	1222
		95% Standard Bootstrap UCL	1164
Anderson-Darling Test Statistic	0.445	95% Bootstrap-t UCL	1551
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	3236
Kolmogorov-Smirnov Test Statistic	0.194	95% Percentile Bootstrap UCL	1199
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	1320
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1789
		97.5% Chebyshev(Mean, Sd) UCL	2207
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3028
95% Approximate Gamma UCL	1372		
95% Adjusted Gamma UCL	1489		

Potential UCL to Use		Use 95% Approximate Gamma UCL	1372
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	12.1 Minimum of Log Data	2.493
Maximum	80.6 Maximum of Log Data	4.389
Mean	61.12 Mean of log Data	4.038
Median	63.06 SD of log Data	0.496
SD	16.82	
Coefficient of Variation	0.275	
Skewness	-2.429	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.67 Shapiro Wilk Test Statistic	0.498
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	69.83 95% H-UCL	88.25
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	103.9
95% Adjusted-CLT UCL (Chen-1995)	65.46 97.5% Chebyshev (MVUE) UCL	121.4
95% Modified-t UCL (Johnson-1978)	69.27 99% Chebyshev (MVUE) UCL	155.8

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.188 Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.78	
MLE of Mean	61.12	
MLE of Standard Deviation	26.83	
nu star	124.5	
Approximate Chi Square Value (.05)	99.74 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	69.1
Adjusted Chi Square Value	96.36 95% Jackknife UCL	69.83
	95% Standard Bootstrap UCL	68.69
Anderson-Darling Test Statistic	2.388 95% Bootstrap-t UCL	67.52
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	66.66
Kolmogorov-Smirnov Test Statistic	0.429 95% Percentile Bootstrap UCL	67.61
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	66.69
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	82.28
	97.5% Chebyshev(Mean, Sd) UCL	91.43
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	109.4
95% Approximate Gamma UCL	76.29	
95% Adjusted Gamma UCL	78.97	

Potential UCL to Use Use 95% Student's-t UCL 69.83
or 95% Modified-t UCL 69.27

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	0.035 Minimum of Log Data	-3.352
Maximum	10 Maximum of Log Data	2.303
Mean	7.496 Mean of log Data	1.284
Median	8.693 SD of log Data	2.112
SD	3.671	
Coefficient of Variation	0.49	
Skewness	-1.624	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.682 Shapiro Wilk Test Statistic	0.518
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	9.4 95% H-UCL	924.6
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	84.57
95% Adjusted-CLT UCL (Chen-1995)	8.708 97.5% Chebyshev (MVUE) UCL	111.7
95% Modified-t UCL (Johnson-1978)	9.317 99% Chebyshev (MVUE) UCL	164.9

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.664 Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.29	
MLE of Mean	7.496	
MLE of Standard Deviation	9.2	
nu star	15.93	
Approximate Chi Square Value (.05)	7.915 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	9.24
Adjusted Chi Square Value	7.069 95% Jackknife UCL	9.4
	95% Standard Bootstrap UCL	9.15
Anderson-Darling Test Statistic	2.932 95% Bootstrap-t UCL	8.878
Anderson-Darling 5% Critical Value	0.763 95% Hall's Bootstrap UCL	8.791
Kolmogorov-Smirnov Test Statistic	0.479 95% Percentile Bootstrap UCL	9.147
Kolmogorov-Smirnov 5% Critical Value	0.254 95% BCA Bootstrap UCL	8.938
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.12
	97.5% Chebyshev(Mean, Sd) UCL	14.11
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.04
95% Approximate Gamma UCL	15.09	
95% Adjusted Gamma UCL	16.9	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.04

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.8 Minimum of Log Data	-0.223
Maximum	1.32 Maximum of Log Data	0.278
Mean	1.06 Mean of log Data	0.0531
Median	1.06 SD of log Data	0.107
SD	0.111	
Coefficient of Variation	0.105	
Skewness	#####	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.592
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.117 95% H-UCL	1.124
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.204
95% Adjusted-CLT UCL (Chen-1995)	1.113 97.5% Chebyshev (MVUE) UCL	1.266
95% Modified-t UCL (Johnson-1978)	1.117 99% Chebyshev (MVUE) UCL	1.388

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	72.7 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0146	
MLE of Mean	1.06	
MLE of Standard Deviation	0.124	
nu star	1745	
Approximate Chi Square Value (.05)	1649 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	1.113
Adjusted Chi Square Value	1635 95% Jackknife UCL	1.117
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.723 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.43 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.2
	97.5% Chebyshev(Mean, Sd) UCL	1.26
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.378
95% Approximate Gamma UCL	1.122	
95% Adjusted Gamma UCL	1.132	

Potential UCL to Use Use 95% Student's-t UCL 1.117
 or 95% Modified-t UCL 1.117

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-07.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.88	Minimum of Log Data	1.772
Maximum	11	Maximum of Log Data	2.398
Mean	9.37	Mean of log Data	2.22
Median	9.525	SD of log Data	0.197
SD	1.688		
Coefficient of Variation	0.18		
Skewness	-0.764		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.873	Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.11	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.29
95% Adjusted-CLT UCL (Chen-1995)	9.978	95% Chebyshev (MVUE) UCL	11.4
95% Modified-t UCL (Johnson-1978)	10.1	97.5% Chebyshev (MVUE) UCL	12.28
		99% Chebyshev (MVUE) UCL	14

Gamma Distribution Test

k star (bias corrected)	23.92	Data Distribution	
Theta Star	0.392	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	9.37		
MLE of Standard Deviation	1.916		
nu star	765.5		
Approximate Chi Square Value (.05)	702.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	10.06
Adjusted Chi Square Value	695.4	95% Jackknife UCL	10.11
		95% Standard Bootstrap UCL	10.03
Anderson-Darling Test Statistic	0.859	95% Bootstrap-t UCL	9.998
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	9.981
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	10.03
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	9.981
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.21
		97.5% Chebyshev(Mean, Sd) UCL	12.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.57
95% Approximate Gamma UCL	10.21		
95% Adjusted Gamma UCL	10.31		

Potential UCL to Use	Use 95% Approximate Gamma UCL	10.21
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 13

Raw Statistics

Minimum	32.93	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.494
Mean	49.43	Maximum of Log Data	4.443
Median	42.93	Mean of log Data	3.845
SD	18.64	SD of log Data	0.33
Coefficient of Variation	0.377		
Skewness	1.362		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.752	Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	57.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	58
95% Adjusted-CLT UCL (Chen-1995)	58.79	95% Chebyshev (MVUE) UCL	67.11
95% Modified-t UCL (Johnson-1978)	57.87	97.5% Chebyshev (MVUE) UCL	74.86
		99% Chebyshev (MVUE) UCL	90.09

Gamma Distribution Test

k star (bias corrected)	7.471	Data Distribution	
Theta Star	6.616	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	49.43		
MLE of Standard Deviation	18.08		
nu star	239.1		
Approximate Chi Square Value (.05)	204.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	57.1
Adjusted Chi Square Value	200.6	95% Jackknife UCL	57.6
		95% Standard Bootstrap UCL	56.92
Anderson-Darling Test Statistic	1.237	95% Bootstrap-t UCL	60.18
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	56.26
Kolmogorov-Smirnov Test Statistic	0.206	95% Percentile Bootstrap UCL	56.87
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	58.09
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	69.75
		97.5% Chebyshev(Mean, Sd) UCL	78.54
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	95.8
95% Approximate Gamma UCL	57.85		
95% Adjusted Gamma UCL	58.9		

Potential UCL to Use

Use 95% Approximate Gamma UCL 57.85

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	146.7	Minimum of Log Data	4.988
Maximum	1410	Maximum of Log Data	7.251
Mean	625.6	Mean of log Data	6.265
Median	563.6	SD of log Data	0.635
SD	365.1		
Coefficient of Variation	0.584		
Skewness	0.806		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	785.6	95% H-UCL	923.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1094
95% Adjusted-CLT UCL (Chen-1995)	795.4	97.5% Chebyshev (MVUE) UCL	1294
95% Modified-t UCL (Johnson-1978)	788.7	99% Chebyshev (MVUE) UCL	1685

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.512	Data appear Normal at 5% Significance Level	
Theta Star	249		
MLE of Mean	625.6		
MLE of Standard Deviation	394.7		
nu star	80.39		
Approximate Chi Square Value (.05)	60.73	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	775.7
Adjusted Chi Square Value	58.79	95% Jackknife UCL	785.6
		95% Standard Bootstrap UCL	771.4
Anderson-Darling Test Statistic	0.268	95% Bootstrap-t UCL	806
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	799.4
Kolmogorov-Smirnov Test Statistic	0.117	95% Percentile Bootstrap UCL	769.8
Kolmogorov-Smirnov 5% Critical Value	0.217	95% BCA Bootstrap UCL	788.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1023
		97.5% Chebyshev(Mean, Sd) UCL	1196
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1534
95% Approximate Gamma UCL	828.1		
95% Adjusted Gamma UCL	855.5		

Potential UCL to Use Use 95% Student's-t UCL 785.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	6.4 Minimum of Log Data	1.856
Maximum	77.14 Maximum of Log Data	4.346
Mean	56.78 Mean of log Data	3.88
Median	65 SD of log Data	0.753
SD	19.94	
Coefficient of Variation	0.351	
Skewness	-2.222	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.597 Shapiro Wilk Test Statistic	0.487
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	65.51	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	101.5
95% Adjusted-CLT UCL (Chen-1995)	62.02	95% Chebyshev (MVUE) UCL	117.9
95% Modified-t UCL (Johnson-1978)	65.05	97.5% Chebyshev (MVUE) UCL	141.7
		99% Chebyshev (MVUE) UCL	188.4

Gamma Distribution Test

k star (bias corrected)	2.721	Data Distribution	
Theta Star	20.86	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	56.78		
MLE of Standard Deviation	34.42		
nu star	87.08		
Approximate Chi Square Value (.05)	66.57	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	64.97
Adjusted Chi Square Value	64.53	95% Jackknife UCL	65.51
		95% Standard Bootstrap UCL	64.57
Anderson-Darling Test Statistic	3.852	95% Bootstrap-t UCL	63.57
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	62.94
Kolmogorov-Smirnov Test Statistic	0.448	95% Percentile Bootstrap UCL	64.22
Kolmogorov-Smirnov 5% Critical Value	0.217	95% BCA Bootstrap UCL	62.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.5
		97.5% Chebyshev(Mean, Sd) UCL	87.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.4
95% Approximate Gamma UCL	74.27		
95% Adjusted Gamma UCL	76.62		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 78.5

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.034	Minimum of Log Data	-3.381
Maximum	13.53	Maximum of Log Data	2.605
Mean	9.564	Mean of log Data	1.963
Median		10 SD of log Data	1.427
SD	2.698		
Coefficient of Variation	0.282		
Skewness	-3.109		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.473	Shapiro Wilk Test Statistic	0.307
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.75	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.37
95% Adjusted-CLT UCL (Chen-1995)	10.11	95% Chebyshev (MVUE) UCL	49.13
95% Modified-t UCL (Johnson-1978)	10.66	97.5% Chebyshev (MVUE) UCL	62.76
		99% Chebyshev (MVUE) UCL	89.52

Gamma Distribution Test

k star (bias corrected)	1.539	Data Distribution	
Theta Star	6.216	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.564		
MLE of Standard Deviation	7.71		
nu star	49.23		
Approximate Chi Square Value (.05)	34.13	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	10.67
Adjusted Chi Square Value	32.7	95% Jackknife UCL	10.75
		95% Standard Bootstrap UCL	10.61
Anderson-Darling Test Statistic	5.236	95% Bootstrap-t UCL	10.35
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	10.25
Kolmogorov-Smirnov Test Statistic	0.535	95% Percentile Bootstrap UCL	10.43
Kolmogorov-Smirnov 5% Critical Value	0.218	95% BCA Bootstrap UCL	10.36
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.5
		97.5% Chebyshev(Mean, Sd) UCL	13.78
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.28
95% Approximate Gamma UCL	13.8		
95% Adjusted Gamma UCL	14.4		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 12.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-08.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.46	Minimum of Log Data	-0.777
Maximum	0.62	Maximum of Log Data	-0.478
Mean	0.54	Mean of log Data	-0.618
Median	0.54	SD of log Data	0.0638
SD	0.0341		
Coefficient of Variation	0.0632		
Skewness	#####		

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.597
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.558	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.583
95% Adjusted-CLT UCL (Chen-1995)	0.556	97.5% Chebyshev (MVUE) UCL	0.602
95% Modified-t UCL (Johnson-1978)	0.558	99% Chebyshev (MVUE) UCL	0.639

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	203	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00266		
MLE of Mean	0.54		
MLE of Standard Deviation	0.0379		
nu star	4871		
Approximate Chi Square Value (.05)	4710	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.556
Adjusted Chi Square Value	4685	95% Jackknife UCL	0.558
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.717	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.425	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.583
		97.5% Chebyshev(Mean, Sd) UCL	0.601
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.638
95% Approximate Gamma UCL	0.558		
95% Adjusted Gamma UCL	0.561		

Potential UCL to Use

Use 95% Student's-t UCL	0.558
or 95% Modified-t UCL	0.558

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	6.43	Minimum of Log Data	1.861
Maximum	14.03	Maximum of Log Data	2.641
Mean	9.793	Mean of log Data	2.26
Median	9.793	SD of log Data	0.22
SD	2.077		
Coefficient of Variation	0.212		
Skewness	0.135		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.87	95% H-UCL	11.11
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.53
95% Adjusted-CLT UCL (Chen-1995)	10.8	97.5% Chebyshev (MVUE) UCL	13.71
95% Modified-t UCL (Johnson-1978)	10.87	99% Chebyshev (MVUE) UCL	16.03

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	17.58	Data appear Normal at 5% Significance Level	
Theta Star	0.557		
MLE of Mean	9.793		
MLE of Standard Deviation	2.336		
nu star	422		
Approximate Chi Square Value (.05)	375.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.78
Adjusted Chi Square Value	368.6	95% Jackknife UCL	10.87
		95% Standard Bootstrap UCL	10.74
Anderson-Darling Test Statistic	0.474	95% Bootstrap-t UCL	10.88
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	10.97
Kolmogorov-Smirnov Test Statistic	0.194	95% Percentile Bootstrap UCL	10.73
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.74
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.41
		97.5% Chebyshev(Mean, Sd) UCL	13.54
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.76
95% Approximate Gamma UCL	11.01		
95% Adjusted Gamma UCL	11.21		

Potential UCL to Use Use 95% Student's-t UCL 10.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.007	Minimum of Log Data	-4.962
Maximum	0.36	Maximum of Log Data	-1.022
Mean	0.184	Mean of log Data	-1.912
Median	0.184	SD of log Data	0.98
SD	0.0753		
Coefficient of Variation	0.41		
Skewness	2.22E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.441
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.223	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.559
95% Adjusted-CLT UCL (Chen-1995)	0.219	95% Chebyshev (MVUE) UCL	0.525
95% Modified-t UCL (Johnson-1978)	0.223	97.5% Chebyshev (MVUE) UCL	0.654
		99% Chebyshev (MVUE) UCL	0.907

Gamma Distribution Test

k star (bias corrected)	1.907	Data Distribution	
Theta Star	0.0962	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.184		
MLE of Standard Deviation	0.133		
nu star	45.76		
Approximate Chi Square Value (.05)	31.24	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.219
Adjusted Chi Square Value	29.42	95% Jackknife UCL	0.223
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.116	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.501	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.278
		97.5% Chebyshev(Mean, Sd) UCL	0.319
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.4
95% Approximate Gamma UCL	0.269		
95% Adjusted Gamma UCL	0.285		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.278

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

		Log-transformed Statistics	
Minimum	11	Minimum of Log Data	2.398
Maximum	85	Maximum of Log Data	4.443
Mean	45.58	Mean of log Data	3.696
Median	46.18	SD of log Data	0.591
SD	19.31		
Coefficient of Variation	0.424		
Skewness	-0.14		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Test Statistic	0.739
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	55.59	95% H-UCL	71.71
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	83.35
95% Adjusted-CLT UCL (Chen-1995)	54.51	97.5% Chebyshev (MVUE) UCL	99.01
95% Modified-t UCL (Johnson-1978)	55.55	99% Chebyshev (MVUE) UCL	129.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.201	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.24		
MLE of Mean	45.58		
MLE of Standard Deviation	25.47		
nu star	76.83		
Approximate Chi Square Value (.05)	57.64	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	54.75
Adjusted Chi Square Value	55.11	95% Jackknife UCL	55.59
		95% Standard Bootstrap UCL	54.37
Anderson-Darling Test Statistic	1.386	95% Bootstrap-t UCL	55.05
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	56.06
Kolmogorov-Smirnov Test Statistic	0.364	95% Percentile Bootstrap UCL	54.05
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	54.25
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	69.88
		97.5% Chebyshev(Mean, Sd) UCL	80.39
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	101
95% Approximate Gamma UCL	60.75		
95% Adjusted Gamma UCL	63.54		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	69.88
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	4.8	Minimum of Log Data	1.569
Maximum	18.7	Maximum of Log Data	2.929
Mean	11.75	Mean of log Data	2.428
Median	11.75	SD of log Data	0.302
SD	2.963		
Coefficient of Variation	0.252		
Skewness	#####		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.553
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.29	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.14
95% Adjusted-CLT UCL (Chen-1995)	13.16	95% Chebyshev (MVUE) UCL	16.35
95% Modified-t UCL (Johnson-1978)	13.29	97.5% Chebyshev (MVUE) UCL	18.31
		99% Chebyshev (MVUE) UCL	22.16

Gamma Distribution Test

k star (bias corrected)	10.63	Data Distribution	
Theta Star	1.105	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.75		
MLE of Standard Deviation	3.604		
nu star	255.1		
Approximate Chi Square Value (.05)	219.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	13.16
Adjusted Chi Square Value	214.1	95% Jackknife UCL	13.29
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.781	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.452	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.48
		97.5% Chebyshev(Mean, Sd) UCL	17.09
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.26
95% Approximate Gamma UCL	13.68		
95% Adjusted Gamma UCL	14		

Potential UCL to Use		Use 95% Student's-t UCL	13.29
		or 95% Modified-t UCL	13.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	233.8	Minimum of Log Data	5.455
Maximum	2810	Maximum of Log Data	7.941
Mean	899.9	Mean of log Data	6.575
Median	644.8	SD of log Data	0.676
SD	726.3		
Coefficient of Variation	0.807		
Skewness	2.019		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.754	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1276	95% H-UCL	1463
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1660
95% Adjusted-CLT UCL (Chen-1995)	1375	97.5% Chebyshev (MVUE) UCL	1997
95% Modified-t UCL (Johnson-1978)	1297	99% Chebyshev (MVUE) UCL	2660

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.821	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	494.1		
MLE of Mean	899.9		
MLE of Standard Deviation	666.8		
nu star	43.71		
Approximate Chi Square Value (.05)	29.55	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1245
Adjusted Chi Square Value	27.79	95% Jackknife UCL	1276
		95% Standard Bootstrap UCL	1229
Anderson-Darling Test Statistic	0.542	95% Bootstrap-t UCL	1890
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	3223
Kolmogorov-Smirnov Test Statistic	0.247	95% Percentile Bootstrap UCL	1257
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	1370
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1814
		97.5% Chebyshev(Mean, Sd) UCL	2209
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2986
95% Approximate Gamma UCL	1331		
95% Adjusted Gamma UCL	1416		

Potential UCL to Use Use 95% Approximate Gamma UCL 1331

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	7 Minimum of Log Data	1.946
Maximum	65 Maximum of Log Data	4.174
Mean	52.19 Mean of log Data	3.79
Median	62.54 SD of log Data	0.741
SD	20.57	
Coefficient of Variation	0.394	
Skewness	-1.768	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.663 Shapiro Wilk Test Statistic	0.582
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	62.85 95% H-UCL	101.3
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	112
95% Adjusted-CLT UCL (Chen-1995)	58.71 97.5% Chebyshev (MVUE) UCL	135.9
95% Modified-t UCL (Johnson-1978)	62.35 99% Chebyshev (MVUE) UCL	182.9

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.455 Data do not follow a Discernable Distribution (0.05)	
Theta Star	21.25	
MLE of Mean	52.19	
MLE of Standard Deviation	33.3	
nu star	58.93	
Approximate Chi Square Value (.05)	42.28 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	61.95
Adjusted Chi Square Value	40.14 95% Jackknife UCL	62.85
	95% Standard Bootstrap UCL	61.4
Anderson-Darling Test Statistic	2.296 95% Bootstrap-t UCL	60.2
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	59.13
Kolmogorov-Smirnov Test Statistic	0.408 95% Percentile Bootstrap UCL	61.39
Kolmogorov-Smirnov 5% Critical Value	0.247 95% BCA Bootstrap UCL	59.66
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	78.07
	97.5% Chebyshev(Mean, Sd) UCL	89.28
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	111.3
95% Approximate Gamma UCL	72.74	
95% Adjusted Gamma UCL	76.62	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 78.07
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.008	Minimum of Log Data	-4.828
Maximum	0.485	Maximum of Log Data	-0.724
Mean	0.247	Mean of log Data	-1.63
Median	0.247	SD of log Data	1.026
SD	0.102		
Coefficient of Variation	0.413		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.436
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.299	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.829
95% Adjusted-CLT UCL (Chen-1995)	0.295	95% Chebyshev (MVUE) UCL	0.744
95% Modified-t UCL (Johnson-1978)	0.299	97.5% Chebyshev (MVUE) UCL	0.931
		99% Chebyshev (MVUE) UCL	1.299

Gamma Distribution Test

k star (bias corrected)	1.806	Data Distribution	
Theta Star	0.136	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.247		
MLE of Standard Deviation	0.183		
nu star	43.34		
Approximate Chi Square Value (.05)	29.25	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.295
Adjusted Chi Square Value	27.49	95% Jackknife UCL	0.299
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.14	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.504	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.374
		97.5% Chebyshev(Mean, Sd) UCL	0.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.539
95% Approximate Gamma UCL	0.365		
95% Adjusted Gamma UCL	0.389		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.374

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.85	Minimum of Log Data	-0.163
Maximum	1.39	Maximum of Log Data	0.329
Mean	1.12	Mean of log Data	0.108
Median	1.12	SD of log Data	0.106
SD	0.115		
Coefficient of Variation	0.103		
Skewness	1.74E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.592
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.18	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.186
95% Adjusted-CLT UCL (Chen-1995)	1.175	95% Chebyshev (MVUE) UCL	1.269
95% Modified-t UCL (Johnson-1978)	1.18	97.5% Chebyshev (MVUE) UCL	1.333
		99% Chebyshev (MVUE) UCL	1.46

Gamma Distribution Test

k star (bias corrected)	75.34	Data Distribution	
Theta Star	0.0149	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.12		
MLE of Standard Deviation	0.129		
nu star	1808		
Approximate Chi Square Value (.05)	1710	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.175
Adjusted Chi Square Value	1696	95% Jackknife UCL	1.18
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.723	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.43	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.265
		97.5% Chebyshev(Mean, Sd) UCL	1.328
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.451
95% Approximate Gamma UCL	1.184		
95% Adjusted Gamma UCL	1.194		

Potential UCL to Use	Use 95% Student's-t UCL	1.18
	or 95% Modified-t UCL	1.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-09.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	9
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.2	Minimum of Log Data	1.649
Maximum	14	Maximum of Log Data	2.639
Mean	8.442	Mean of log Data	2.088
Median	8.442	SD of log Data	0.309
SD	2.693		
Coefficient of Variation	0.319		
Skewness	0.732		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.773	95% H-UCL	10.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.62
95% Adjusted-CLT UCL (Chen-1995)	9.833	97.5% Chebyshev (MVUE) UCL	13
95% Modified-t UCL (Johnson-1978)	9.799	99% Chebyshev (MVUE) UCL	15.71

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	8.735	Data appear Normal at 5% Significance Level	
Theta Star	0.966		
MLE of Mean	8.442		
MLE of Standard Deviation	2.856		
nu star	227.1		
Approximate Chi Square Value (.05)	193.2	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	9.671
Adjusted Chi Square Value	188.8	95% Jackknife UCL	9.773
		95% Standard Bootstrap UCL	9.584
Anderson-Darling Test Statistic	0.401	95% Bootstrap-t UCL	10
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	9.873
Kolmogorov-Smirnov Test Statistic	0.164	95% Percentile Bootstrap UCL	9.6
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	9.72
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.7
		97.5% Chebyshev(Mean, Sd) UCL	13.11
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.87
95% Approximate Gamma UCL	9.922		
95% Adjusted Gamma UCL	10.16		

Potential UCL to Use

Use 95% Student's-t UCL	9.773
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 11

Raw Statistics

Minimum	32.84	Log-transformed Statistics	
Maximum	51.65	Minimum of Log Data	3.492
Mean	42.04	Maximum of Log Data	3.944
Median	42.04	Mean of log Data	3.73
SD	5.546	SD of log Data	0.134
Coefficient of Variation	0.132		
Skewness	0.024		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	44.78	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	45.08
95% Adjusted-CLT UCL (Chen-1995)	44.58	95% Chebyshev (MVUE) UCL	48.87
95% Modified-t UCL (Johnson-1978)	44.78	97.5% Chebyshev (MVUE) UCL	51.82
		99% Chebyshev (MVUE) UCL	57.62

Gamma Distribution Test

k star (bias corrected)	47.16	Data Distribution	
Theta Star	0.891	Data appear Normal at 5% Significance Level	
MLE of Mean	42.04		
MLE of Standard Deviation	6.122		
nu star	1226		
Approximate Chi Square Value (.05)	1146	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	44.57
Adjusted Chi Square Value	1135	95% Jackknife UCL	44.78
		95% Standard Bootstrap UCL	44.56
Anderson-Darling Test Statistic	0.421	95% Bootstrap-t UCL	44.88
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	44.98
Kolmogorov-Smirnov Test Statistic	0.175	95% Percentile Bootstrap UCL	44.41
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	44.51
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	48.74
		97.5% Chebyshev(Mean, Sd) UCL	51.65
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	57.34
95% Approximate Gamma UCL	44.99		
95% Adjusted Gamma UCL	45.42		

Potential UCL to Use

Use 95% Student's-t UCL 44.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	129.4	Minimum of Log Data	4.863
Maximum	1080	Maximum of Log Data	6.985
Mean	427.5	Mean of log Data	5.905
Median	427.5	SD of log Data	0.58
SD	256.1		
Coefficient of Variation	0.599		
Skewness	1.458		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.875	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	554.1	95% H-UCL	628.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	737.9
95% Adjusted-CLT UCL (Chen-1995)	575	97.5% Chebyshev (MVUE) UCL	872.1
95% Modified-t UCL (Johnson-1978)	558.9	99% Chebyshev (MVUE) UCL	1136

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.681	Data appear Normal at 5% Significance Level	
Theta Star	159.5		
MLE of Mean	427.5		
MLE of Standard Deviation	261.1		
nu star	69.71		
Approximate Chi Square Value (.05)	51.49	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	544.3
Adjusted Chi Square Value	49.26	95% Jackknife UCL	554.1
		95% Standard Bootstrap UCL	543.6
Anderson-Darling Test Statistic	0.264	95% Bootstrap-t UCL	610
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	1202
Kolmogorov-Smirnov Test Statistic	0.121	95% Percentile Bootstrap UCL	543.1
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	578
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	737.1
		97.5% Chebyshev(Mean, Sd) UCL	871.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1134
95% Approximate Gamma UCL	578.8		
95% Adjusted Gamma UCL	605		

Potential UCL to Use Use 95% Student's-t UCL 554.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics

Minimum	9.2	Minimum of Log Data	2.219
Maximum	65	Maximum of Log Data	4.174
Mean	58.9	Mean of log Data	3.995
Median	65	SD of log Data	0.535
SD	15.19		
Coefficient of Variation	0.258		
Skewness	-3.4		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.443	Shapiro Wilk Test Statistic	0.371
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.41	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	87.45
95% Adjusted-CLT UCL (Chen-1995)	61.59	95% Chebyshev (MVUE) UCL	103.2
95% Modified-t UCL (Johnson-1978)	65.75	97.5% Chebyshev (MVUE) UCL	121
		99% Chebyshev (MVUE) UCL	156.1

Gamma Distribution Test

k star (bias corrected)	4.924	Data Distribution	
Theta Star	11.96	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.9		
MLE of Standard Deviation	26.54		
nu star	128		
Approximate Chi Square Value (.05)	102.9	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	65.83
Adjusted Chi Square Value	99.68	95% Jackknife UCL	66.41
		95% Standard Bootstrap UCL	65.5
Anderson-Darling Test Statistic	3.642	95% Bootstrap-t UCL	64.07
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	63.14
Kolmogorov-Smirnov Test Statistic	0.476	95% Percentile Bootstrap UCL	63.73
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	63.26
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	77.27
		97.5% Chebyshev(Mean, Sd) UCL	85.21
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	100.8
95% Approximate Gamma UCL	73.29		
95% Adjusted Gamma UCL	75.65		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 77.27

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	0.031 Minimum of Log Data	-3.474
Maximum	10.73 Maximum of Log Data	2.373
Mean	8.079 Mean of log Data	1.375
Median	10 SD of log Data	2.14
SD	3.678	
Coefficient of Variation	0.455	
Skewness	-1.93	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.622 Shapiro Wilk Test Statistic	0.481
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	9.898 95% H-UCL	921.1
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	98.94
95% Adjusted-CLT UCL (Chen-1995)	9.175 97.5% Chebyshev (MVUE) UCL	130.6
95% Modified-t UCL (Johnson-1978)	9.807 99% Chebyshev (MVUE) UCL	192.8

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.688 Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.75	
MLE of Mean	8.079	
MLE of Standard Deviation	9.744	
nu star	17.88	
Approximate Chi Square Value (.05)	9.302 Nonparametric Statistics	
Adjusted Level of Significance	0.03 95% CLT UCL	9.757
Adjusted Chi Square Value	8.433 95% Jackknife UCL	9.898
	95% Standard Bootstrap UCL	9.677
Anderson-Darling Test Statistic	3.556 95% Bootstrap-t UCL	9.514
Anderson-Darling 5% Critical Value	0.766 95% Hall's Bootstrap UCL	9.304
Kolmogorov-Smirnov Test Statistic	0.491 95% Percentile Bootstrap UCL	9.557
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	9.374
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.53
	97.5% Chebyshev(Mean, Sd) UCL	14.45
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.23
95% Approximate Gamma UCL	15.53	
95% Adjusted Gamma UCL	17.13	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.23

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-10.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.33	Minimum of Log Data	1.673
Maximum	14.08	Maximum of Log Data	2.645
Mean	9.595	Mean of log Data	2.221
Median	9.595	SD of log Data	0.303
SD	2.749		
Coefficient of Variation	0.286		
Skewness	0.16		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	11.02	95% H-UCL	11.51
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.32
95% Adjusted-CLT UCL (Chen-1995)	10.94	97.5% Chebyshev (MVUE) UCL	14.92
95% Modified-t UCL (Johnson-1978)	11.03	99% Chebyshev (MVUE) UCL	18.07

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.486	Data appear Normal at 5% Significance Level	
Theta Star	1.011		
MLE of Mean	9.595		
MLE of Standard Deviation	3.115		
nu star	227.7		
Approximate Chi Square Value (.05)	193.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.9
Adjusted Chi Square Value	189	95% Jackknife UCL	11.02
		95% Standard Bootstrap UCL	10.82
Anderson-Darling Test Statistic	0.405	95% Bootstrap-t UCL	11.05
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11.12
Kolmogorov-Smirnov Test Statistic	0.204	95% Percentile Bootstrap UCL	10.89
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.79
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.05
		97.5% Chebyshev(Mean, Sd) UCL	14.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.49
95% Approximate Gamma UCL	11.28		
95% Adjusted Gamma UCL	11.56		

Potential UCL to Use		Use 95% Student's-t UCL	11.02
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cesium-137 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	33.82	Minimum of Log Data	3.521
Maximum	85	Maximum of Log Data	4.443
Mean	52.41	Mean of log Data	3.918
Median	51.18	SD of log Data	0.292
SD	16.69		
Coefficient of Variation	0.318		
Skewness	1.273		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.804	Shapiro Wilk Test Statistic	0.878
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	61.07	95% H-UCL	62.14
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	71.66
95% Adjusted-CLT UCL (Chen-1995)	62.23	97.5% Chebyshev (MVUE) UCL	80.04
95% Modified-t UCL (Johnson-1978)	61.36	99% Chebyshev (MVUE) UCL	96.49

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.301	Data appear Lognormal at 5% Significance Level	
Theta Star	5.635		
MLE of Mean	52.41		
MLE of Standard Deviation	17.19		
nu star	223.2		
Approximate Chi Square Value (.05)	189.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	60.34
Adjusted Chi Square Value	184.9	95% Jackknife UCL	61.07
		95% Standard Bootstrap UCL	59.99
Anderson-Darling Test Statistic	0.789	95% Bootstrap-t UCL	67.86
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	119.8
Kolmogorov-Smirnov Test Statistic	0.295	95% Percentile Bootstrap UCL	60.29
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	62.49
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	73.42
		97.5% Chebyshev(Mean, Sd) UCL	82.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	100.4
95% Approximate Gamma UCL	61.7		
95% Adjusted Gamma UCL	63.27		

Potential UCL to Use

Use 95% Student's-t UCL	61.07
or 95% Modified-t UCL	61.36
or 95% H-UCL	62.14

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics	Log-transformed Statistics		
Minimum	0.039	Minimum of Log Data	-3.257
Maximum	10	Maximum of Log Data	2.303
Mean	8.514	Mean of log Data	1.768
Median	9.257	SD of log Data	1.585
SD	2.784		
Coefficient of Variation	0.327		
Skewness	-2.98		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.552	Shapiro Wilk Test Statistic	0.37
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	9.957	95% H-UCL	143.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	54.17
95% Adjusted-CLT UCL (Chen-1995)	9.098	97.5% Chebyshev (MVUE) UCL	70.26
95% Modified-t UCL (Johnson-1978)	9.842	99% Chebyshev (MVUE) UCL	101.8

Gamma Distribution Test	Data Distribution		
k star (bias corrected)	1.167	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.295		
MLE of Mean	8.514		
MLE of Standard Deviation	7.881		
nu star	28.01		
Approximate Chi Square Value (.05)	16.93	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9.836
Adjusted Chi Square Value	15.63	95% Jackknife UCL	9.957
		95% Standard Bootstrap UCL	9.766
Anderson-Darling Test Statistic	3.524	95% Bootstrap-t UCL	9.494
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	9.398
Kolmogorov-Smirnov Test Statistic	0.501	95% Percentile Bootstrap UCL	9.505
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	9.307
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.02
		97.5% Chebyshev(Mean, Sd) UCL	13.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.51
95% Approximate Gamma UCL	14.08		
95% Adjusted Gamma UCL	15.25		

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) U	16.51
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

Minimum	9.4	Minimum of Log Data	2.241
Maximum	75.99	Maximum of Log Data	4.331
Mean	59.88	Mean of log Data	4.003
Median	65	SD of log Data	0.559
SD	16.56		
Coefficient of Variation	0.277		
Skewness	-2.96		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.581	Shapiro Wilk Test Statistic	0.439
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.46	95% H-UCL	93.12
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	108.9
95% Adjusted-CLT UCL (Chen-1995)	63.38	97.5% Chebyshev (MVUE) UCL	128.7
95% Modified-t UCL (Johnson-1978)	67.78	99% Chebyshev (MVUE) UCL	167.5

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	4.396	Data Distribution	
Theta Star	13.62	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	59.88		
MLE of Standard Deviation	28.56		
nu star	105.5		
Approximate Chi Square Value (.05)	82.81	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	67.74
Adjusted Chi Square Value	79.74	95% Jackknife UCL	68.46
		95% Standard Bootstrap UCL	67.43
Anderson-Darling Test Statistic	2.865	95% Bootstrap-t UCL	65.87
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	64.82
Kolmogorov-Smirnov Test Statistic	0.472	95% Percentile Bootstrap UCL	65.86
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	64.94
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.71
		97.5% Chebyshev(Mean, Sd) UCL	89.73
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	107.4
95% Approximate Gamma UCL	76.3		
95% Adjusted Gamma UCL	79.23		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) U 80.71
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-11.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	6.09	Log-transformed Statistics	
Maximum	12.46	Minimum of Log Data	1.807
Mean	9.759	Maximum of Log Data	2.523
Median	10.65	Mean of log Data	2.258
SD	1.935	SD of log Data	0.218
Coefficient of Variation	0.198		
Skewness	-0.75		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Test Statistic	0.856
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.76	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.06
95% Adjusted-CLT UCL (Chen-1995)	10.55	95% Chebyshev (MVUE) UCL	12.47
95% Modified-t UCL (Johnson-1978)	10.74	97.5% Chebyshev (MVUE) UCL	13.63
		99% Chebyshev (MVUE) UCL	15.93

Gamma Distribution Test

k star (bias corrected)	18.53	Data Distribution	
Theta Star	0.527	Data appear Normal at 5% Significance Level	
MLE of Mean	9.759		
MLE of Standard Deviation	2.267		
nu star	444.7		
Approximate Chi Square Value (.05)	396.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.68
Adjusted Chi Square Value	389.9	95% Jackknife UCL	10.76
		95% Standard Bootstrap UCL	10.63
Anderson-Darling Test Statistic	0.84	95% Bootstrap-t UCL	10.63
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	10.51
Kolmogorov-Smirnov Test Statistic	0.249	95% Percentile Bootstrap UCL	10.63
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.55
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.19
		97.5% Chebyshev(Mean, Sd) UCL	13.25
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.32
95% Approximate Gamma UCL	10.94		
95% Adjusted Gamma UCL	11.13		

Potential UCL to Use		Use 95% Student's-t UCL	10.76
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics	Log-transformed Statistics	
Minimum	16.7 Minimum of Log Data	2.815
Maximum	85 Maximum of Log Data	4.443
Mean	62.22 Mean of log Data	4.022
Median	70.78 SD of log Data	0.532
SD	25.82	
Coefficient of Variation	0.415	
Skewness	-0.5	
Relevant UCL Statistics	Lognormal Distribution Test	
Normal Distribution Test	0.808 Shapiro Wilk Test Statistic	0.803
Shapiro Wilk Test Statistic	0.859 Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level		
Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	75.6 95% H-UCL	91.19
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	107
95% Adjusted-CLT UCL (Chen-1995)	73.33 97.5% Chebyshev (MVUE) UCL	125.9
95% Modified-t UCL (Johnson-1978)	75.42 99% Chebyshev (MVUE) UCL	162.9
Gamma Distribution Test	Data Distribution	
k star (bias corrected)	3.634 Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.12	
MLE of Mean	62.22	
MLE of Standard Deviation	32.64	
nu star	87.22	
Approximate Chi Square Value (.05)	66.69 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	74.48
Adjusted Chi Square Value	63.96 95% Jackknife UCL	75.6
	95% Standard Bootstrap UCL	73.9
Anderson-Darling Test Statistic	1.014 95% Bootstrap-t UCL	75.04
Anderson-Darling 5% Critical Value	0.733 95% Hall's Bootstrap UCL	73.04
Kolmogorov-Smirnov Test Statistic	0.307 95% Percentile Bootstrap UCL	73.84
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	72.46
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	94.71
	97.5% Chebyshev(Mean, Sd) UCL	108.8
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	136.4
95% Approximate Gamma UCL	81.37	
95% Adjusted Gamma UCL	84.85	
Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	94.71
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	6.57	Minimum of Log Data	1.883
Maximum		10 Maximum of Log Data	2.303
Mean	9.555	Mean of log Data	2.25
Median		10 SD of log Data	0.131
SD	1.089		
Coefficient of Variation	0.114		
Skewness	-2.44		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.484	Shapiro Wilk Test Statistic	0.48
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.12	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.27
95% Adjusted-CLT UCL (Chen-1995)	9.835	95% Chebyshev (MVUE) UCL	11.14
95% Modified-t UCL (Johnson-1978)	10.08	97.5% Chebyshev (MVUE) UCL	11.82
		99% Chebyshev (MVUE) UCL	13.16

Gamma Distribution Test

k star (bias corrected)	52.64	Data Distribution	
Theta Star	0.182	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.555		
MLE of Standard Deviation	1.317		
nu star	1263		
Approximate Chi Square Value (.05)	1182	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.07
Adjusted Chi Square Value	1170	95% Jackknife UCL	10.12

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.161	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.497	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	10.92
		97.5% Chebyshev(Mean, Sd) UCL	11.52
		99% Chebyshev(Mean, Sd) UCL	12.68

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.21		
95% Adjusted Gamma UCL	10.32		

Potential UCL to Use

	Use 95% Student's-t UCL	10.12
	or 95% Modified-t UCL	10.08

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

Minimum	9.9	Minimum of Log Data	2.293
Maximum	100.7	Maximum of Log Data	4.612
Mean	72.99	Mean of log Data	4.18
Median	73.53	SD of log Data	0.618
SD	24.09		
Coefficient of Variation	0.33		
Skewness	-1.56		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.827	Shapiro Wilk Test Statistic	0.58
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	85.48	95% H-UCL	121.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	140.1
95% Adjusted-CLT UCL (Chen-1995)	81.09	97.5% Chebyshev (MVUE) UCL	167.1
95% Modified-t UCL (Johnson-1978)	84.96	99% Chebyshev (MVUE) UCL	220.2

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	3.573	Data do not follow a Discernable Distribution (0.05)	
Theta Star	20.43		
MLE of Mean	72.99		
MLE of Standard Deviation	38.61		
nu star	85.76		
Approximate Chi Square Value (.05)	65.41	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	84.43
Adjusted Chi Square Value	62.71	95% Jackknife UCL	85.48
		95% Standard Bootstrap UCL	83.78
Anderson-Darling Test Statistic	1.556	95% Bootstrap-t UCL	83.25
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	82.34
Kolmogorov-Smirnov Test Statistic	0.381	95% Percentile Bootstrap UCL	83.56
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	81.37
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	103.3
		97.5% Chebyshev(Mean, Sd) UCL	116.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	142.2
95% Approximate Gamma UCL	95.7		
95% Adjusted Gamma UCL	99.83		

Data Distribution

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 103.3

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.084	Minimum of Log Data	-2.477
Maximum		5 Maximum of Log Data	1.609
Mean	4.59	Mean of log Data	1.269
Median		5 SD of log Data	1.18
SD	1.419		
Coefficient of Variation	0.309		
Skewness	-3.46		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.326	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	22.67
95% Adjusted-CLT UCL (Chen-1995)	4.826	95% Chebyshev (MVUE) UCL	17.06
95% Modified-t UCL (Johnson-1978)	5.258	97.5% Chebyshev (MVUE) UCL	21.61
		99% Chebyshev (MVUE) UCL	30.55

Gamma Distribution Test

k star (bias corrected)	1.64	Data Distribution	
Theta Star	2.8	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.59		
MLE of Standard Deviation	3.585		
nu star	39.35		
Approximate Chi Square Value (.05)	25.98	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.264
Adjusted Chi Square Value	24.33	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.253	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.556	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.376
		97.5% Chebyshev(Mean, Sd) UCL	7.149
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.666
95% Approximate Gamma UCL	6.953		
95% Adjusted Gamma UCL	7.424		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	6.376
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.065	Log-transformed Statistics	
Maximum	13.29	Minimum of Log Data	-2.733
Mean	9.524	Maximum of Log Data	2.587
Median		Mean of log Data	1.914
SD	3.129	10 SD of log Data	1.466
Coefficient of Variation	0.329		
Skewness	-2.81		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.529	Shapiro Wilk Test Statistic	0.366
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	107.7
95% Adjusted-CLT UCL (Chen-1995)	10.23	95% Chebyshev (MVUE) UCL	51.42
95% Modified-t UCL (Johnson-1978)	11.02	97.5% Chebyshev (MVUE) UCL	66.3
		99% Chebyshev (MVUE) UCL	95.53

Gamma Distribution Test

k star (bias corrected)	1.269	Data Distribution	
Theta Star	7.504	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.524		
MLE of Standard Deviation	8.454		
nu star	30.46		
Approximate Chi Square Value (.05)	18.86	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.01
Adjusted Chi Square Value	17.47	95% Jackknife UCL	11.15
		95% Standard Bootstrap UCL	11
Anderson-Darling Test Statistic	3.74	95% Bootstrap-t UCL	10.72
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	10.42
Kolmogorov-Smirnov Test Statistic	0.545	95% Percentile Bootstrap UCL	10.7
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	10.55
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.46
		97.5% Chebyshev(Mean, Sd) UCL	15.16
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.51
95% Approximate Gamma UCL	15.39		
95% Adjusted Gamma UCL	16.6		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	13.46
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-12.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	5.8	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.758
Mean	9.103	Maximum of Log Data	2.398
Median	10.09	Mean of log Data	2.18
SD	2.17	SD of log Data	0.258
Coefficient of Variation	0.238		
Skewness	-0.484		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.789	Shapiro Wilk Test Statistic	0.793
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.23	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.59
95% Adjusted-CLT UCL (Chen-1995)	10.04	95% Chebyshev (MVUE) UCL	12.1
95% Modified-t UCL (Johnson-1978)	10.21	97.5% Chebyshev (MVUE) UCL	13.39
		99% Chebyshev (MVUE) UCL	15.93

Gamma Distribution Test

k star (bias corrected)	13.11	Data Distribution	
Theta Star	0.694	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.103		
MLE of Standard Deviation	2.514		
nu star	314.6		
Approximate Chi Square Value (.05)	274.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.13
Adjusted Chi Square Value	268.8	95% Jackknife UCL	10.23
		95% Standard Bootstrap UCL	10.1

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	10.14
Kolmogorov-Smirnov Test Statistic	0.314	95% Hall's Bootstrap UCL	9.949
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	10.08
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	10.07
		95% Chebyshev(Mean, Sd) UCL	11.83
		97.5% Chebyshev(Mean, Sd) UCL	13.02
		99% Chebyshev(Mean, Sd) UCL	15.34

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.43
95% Adjusted Gamma UCL	10.65

Potential UCL to Use

Use 95% Student's-t UCL	10.23
or 95% Modified-t UCL	10.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	13.5	Minimum of Log Data	2.603
Maximum	85	Maximum of Log Data	4.443
Mean	56.9	Mean of log Data	3.936
Median	50.67	SD of log Data	0.527
SD	23.69		
Coefficient of Variation	0.416		
Skewness	-0.08		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.882	Shapiro Wilk Test Statistic	0.83
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	69.18	95% H-UCL	83.16
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	97.65
95% Adjusted-CLT UCL (Chen-1995)	67.98	97.5% Chebyshev (MVUE) UCL	114.8
95% Modified-t UCL (Johnson-1978)	69.16	99% Chebyshev (MVUE) UCL	148.4

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.75	Data appear Normal at 5% Significance Level	
Theta Star	15.17		
MLE of Mean	56.9		
MLE of Standard Deviation	29.38		
nu star	90		
Approximate Chi Square Value (.05)	69.13	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	68.15
Adjusted Chi Square Value	66.34	95% Jackknife UCL	69.18
		95% Standard Bootstrap UCL	67.68
Anderson-Darling Test Statistic	0.611	95% Bootstrap-t UCL	69.12
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	67.63
Kolmogorov-Smirnov Test Statistic	0.198	95% Percentile Bootstrap UCL	67.35
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	67.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.71
		97.5% Chebyshev(Mean, Sd) UCL	99.61
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	124.9
95% Approximate Gamma UCL	74.09		
95% Adjusted Gamma UCL	77.2		

Potential UCL to Use Use 95% Student's-t UCL 69.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	252.2	Minimum of Log Data	5.53
Maximum	1488	Maximum of Log Data	7.305
Mean	542.8	Mean of log Data	6.165
Median	455.2	SD of log Data	0.502
SD	342.3		
Coefficient of Variation	0.631		
Skewness	2.176		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Test Statistic	0.753	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	720.3	95% H-UCL	746.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	878.6
95% Adjusted-CLT UCL (Chen-1995)	771.6	97.5% Chebyshev (MVUE) UCL	1028
95% Modified-t UCL (Johnson-1978)	730.6	99% Chebyshev (MVUE) UCL	1321

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.013	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	180.2		
MLE of Mean	542.8		
MLE of Standard Deviation	312.7		
nu star	72.32		
Approximate Chi Square Value (.05)	53.73	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	705.3
Adjusted Chi Square Value	51.3	95% Jackknife UCL	720.3
		95% Standard Bootstrap UCL	692.2
Anderson-Darling Test Statistic	0.576	95% Bootstrap-t UCL	884
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	1332
Kolmogorov-Smirnov Test Statistic	0.209	95% Percentile Bootstrap UCL	709.5
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	787.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	973.5
		97.5% Chebyshev(Mean, Sd) UCL	1160
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1526
95% Approximate Gamma UCL	730.5		
95% Adjusted Gamma UCL	765.2		

Potential UCL to Use Use 95% Approximate Gamma UCL 730.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	11.8 Minimum of Log Data	2.468
Maximum	78.6 Maximum of Log Data	4.364
Mean	63.28 Mean of log Data	4.071
Median	65 SD of log Data	0.509
SD	16.91	
Coefficient of Variation	0.267	
Skewness	-2.931	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.56 Shapiro Wilk Test Statistic	0.437
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	72.05	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	92.85
95% Adjusted-CLT UCL (Chen-1995)	66.9	95% Chebyshev (MVUE) UCL	109.2
95% Modified-t UCL (Johnson-1978)	71.36	97.5% Chebyshev (MVUE) UCL	127.9
		99% Chebyshev (MVUE) UCL	164.7

Gamma Distribution Test

k star (bias corrected)	5.065	Data Distribution	
Theta Star	12.49	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.28		
MLE of Standard Deviation	28.12		
nu star	121.6		
Approximate Chi Square Value (.05)	97.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	71.31
Adjusted Chi Square Value	93.76	95% Jackknife UCL	72.05
		95% Standard Bootstrap UCL	71.09
Anderson-Darling Test Statistic	2.932	95% Bootstrap-t UCL	69.35
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	68.44
Kolmogorov-Smirnov Test Statistic	0.495	95% Percentile Bootstrap UCL	69.38
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	68.59
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	84.56
		97.5% Chebyshev(Mean, Sd) UCL	93.77
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	111.9
95% Approximate Gamma UCL	79.22		
95% Adjusted Gamma UCL	82.04		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 84.56
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data	-1.139
Maximum	16.99	Maximum of Log Data	2.833
Mean	9.404	Mean of log Data	1.821
Median		10 SD of log Data	1.365
SD	4.723		
Coefficient of Variation	0.502		
Skewness	-1.014		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.783	Shapiro Wilk Test Statistic	0.569
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.62
95% Adjusted-CLT UCL (Chen-1995)	11.22	95% Chebyshev (MVUE) UCL	39.76
95% Modified-t UCL (Johnson-1978)	11.79	97.5% Chebyshev (MVUE) UCL	50.98
		99% Chebyshev (MVUE) UCL	73.03

Gamma Distribution Test

k star (bias corrected)	1.055	Data Distribution	
Theta Star	8.916	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.404		
MLE of Standard Deviation	9.157		
nu star	25.32		
Approximate Chi Square Value (.05)	14.85	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.65
Adjusted Chi Square Value	13.64	95% Jackknife UCL	11.85
		95% Standard Bootstrap UCL	11.59
Anderson-Darling Test Statistic	2.444	95% Bootstrap-t UCL	11.37
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	11.46
Kolmogorov-Smirnov Test Statistic	0.475	95% Percentile Bootstrap UCL	11.39
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	11.23
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.35
		97.5% Chebyshev(Mean, Sd) UCL	17.92
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	22.97
95% Approximate Gamma UCL	16.03		
95% Adjusted Gamma UCL	17.45		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 15.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Log-transformed Statistics

Minimum	0.394	Minimum of Log Data	-0.931
Maximum	0.891	Maximum of Log Data	-0.115
Mean	0.652	Mean of log Data	-0.442
Median	0.652	SD of log Data	0.178
SD	0.106		
Coefficient of Variation	0.163		
Skewness	-0.303		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.624	Shapiro Wilk Test Statistic	0.594
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Lognormal Distribution

95% Student's-t UCL	0.707	95% H-UCL	0.721
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.799
95% Adjusted-CLT UCL (Chen-1995)	0.699	97.5% Chebyshev (MVUE) UCL	0.863
95% Modified-t UCL (Johnson-1978)	0.706	99% Chebyshev (MVUE) UCL	0.988

Gamma Distribution Test

Data Distribution

k star (bias corrected)	27.83	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0234		
MLE of Mean	0.652		
MLE of Standard Deviation	0.124		
nu star	668		
Approximate Chi Square Value (.05)	609	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.702
Adjusted Chi Square Value	600.4	95% Jackknife UCL	0.707
		95% Standard Bootstrap UCL	0.701
Anderson-Darling Test Statistic	2.572	95% Bootstrap-t UCL	0.697
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	0.711
Kolmogorov-Smirnov Test Statistic	0.439	95% Percentile Bootstrap UCL	0.695
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	0.693
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.785
		97.5% Chebyshev(Mean, Sd) UCL	0.843
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.957
95% Approximate Gamma UCL	0.715		
95% Adjusted Gamma UCL	0.725		

Potential UCL to Use	Use 95% Student's-t UCL	0.707
	or 95% Modified-t UCL	0.706

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-13.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	4.7	Minimum of Log Data	1.548
Maximum	11	Maximum of Log Data	2.398
Mean	9.235	Mean of log Data	2.201
Median	9.235	SD of log Data	0.231
SD	1.81		
Coefficient of Variation	0.196		
Skewness	-1.172		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test	0.857	Shapiro Wilk Test Statistic	0.794
Shapiro Wilk Test Statistic	0.881	Shapiro Wilk Critical Value	0.881
Shapiro Wilk Critical Value		Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.06	95% H-UCL	10.39
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.68
95% Adjusted-CLT UCL (Chen-1995)	9.853	97.5% Chebyshev (MVUE) UCL	12.73
95% Modified-t UCL (Johnson-1978)	10.03	99% Chebyshev (MVUE) UCL	14.79

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	18.24	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.506		
MLE of Mean	9.235		
MLE of Standard Deviation	2.162		
nu star	547.2		

Approximate Chi Square Value (.05)

	494	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10
Adjusted Chi Square Value	487.8	95% Jackknife UCL	10.06
		95% Standard Bootstrap UCL	9.976

Anderson-Darling Test Statistic

	0.957	95% Bootstrap-t UCL	9.946
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	9.874
Kolmogorov-Smirnov Test Statistic	0.261	95% Percentile Bootstrap UCL	9.963
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	9.887
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.27

Assuming Gamma Distribution

		97.5% Chebyshev(Mean, Sd) UCL	12.15
		99% Chebyshev(Mean, Sd) UCL	13.89
95% Approximate Gamma UCL	10.23		
95% Adjusted Gamma UCL	10.36		
Potential UCL to Use		Use 95% Student's-t UCL	10.06
		or 95% Modified-t UCL	10.03

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	39.44	Minimum of Log Data	3.675
Maximum	85	Maximum of Log Data	4.443
Mean	67.35	Mean of log Data	4.181
Median	67.35	SD of log Data	0.254
SD	15.73		
Coefficient of Variation	0.234		
Skewness	-0.375		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.878	Shapiro Wilk Test Statistic	0.867
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	74.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	76.65
95% Adjusted-CLT UCL (Chen-1995)	73.61	95% Chebyshev (MVUE) UCL	86.92
95% Modified-t UCL (Johnson-1978)	74.44	97.5% Chebyshev (MVUE) UCL	95.33
		99% Chebyshev (MVUE) UCL	111.9

Gamma Distribution Test

k star (bias corrected)	14.26	Data Distribution	
Theta Star	4.723	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	67.35		
MLE of Standard Deviation	17.83		
nu star	427.8		
Approximate Chi Square Value (.05)	380.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	74.03
Adjusted Chi Square Value	375.4	95% Jackknife UCL	74.5
		95% Standard Bootstrap UCL	73.6
Anderson-Darling Test Statistic	0.78	95% Bootstrap-t UCL	74.05
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	73.32
Kolmogorov-Smirnov Test Statistic	0.198	95% Percentile Bootstrap UCL	73.6
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	73.6
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	85.05
		97.5% Chebyshev(Mean, Sd) UCL	92.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	107.8
95% Approximate Gamma UCL	75.65		
95% Adjusted Gamma UCL	76.75		

Potential UCL to Use Use 95% Approximate Gamma UCL 75.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	278 Minimum of Log Data	5.628
Maximum	1411 Maximum of Log Data	7.252
Mean	481.9 Mean of log Data	6.089
Median	458.6 SD of log Data	0.389
SD	271.1	
Coefficient of Variation	0.563	
Skewness	3.21E+00	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.58 Shapiro Wilk Test Statistic	0.803
Shapiro Wilk Critical Value	0.881 Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	605.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	583.3
95% Adjusted-CLT UCL (Chen-1995)	659	95% Chebyshev (MVUE) UCL	684.4
95% Modified-t UCL (Johnson-1978)	614.8	97.5% Chebyshev (MVUE) UCL	775.7
		99% Chebyshev (MVUE) UCL	955.1

Gamma Distribution Test

k star (bias corrected)	4.711	Data Distribution	
Theta Star	102.3	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	481.9		
MLE of Standard Deviation	222		
nu star	141.3		
Approximate Chi Square Value (.05)	114.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	597
Adjusted Chi Square Value	111.9	95% Jackknife UCL	605.1
		95% Standard Bootstrap UCL	594.1
Anderson-Darling Test Statistic	1.332	95% Bootstrap-t UCL	765.3
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	1087
Kolmogorov-Smirnov Test Statistic	0.312	95% Percentile Bootstrap UCL	613.6
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	677.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	786.9
		97.5% Chebyshev(Mean, Sd) UCL	919
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1178
95% Approximate Gamma UCL	592.9		
95% Adjusted Gamma UCL	608.5		

Potential UCL to Use

Use 95% Student's-t UCL 605.1
or 95% Modified-t UCL 614.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	10.9 Minimum of Log Data	2.389
Maximum	85.52 Maximum of Log Data	4.449
Mean	61.14 Mean of log Data	4.048
Median	62.93 SD of log Data	0.466
SD	15.15	
Coefficient of Variation	0.248	
Skewness	-2.655	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.559 Shapiro Wilk Test Statistic	0.414
Shapiro Wilk Critical Value	0.881 Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.03	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	82.28
95% Adjusted-CLT UCL (Chen-1995)	64.71	95% Chebyshev (MVUE) UCL	97.5
95% Modified-t UCL (Johnson-1978)	67.58	97.5% Chebyshev (MVUE) UCL	112.3
		99% Chebyshev (MVUE) UCL	141.3

Gamma Distribution Test

k star (bias corrected)	6.311	Data Distribution	
Theta Star	9.688	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.14		
MLE of Standard Deviation	24.34		
nu star	189.3		
Approximate Chi Square Value (.05)	158.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	67.57
Adjusted Chi Square Value	155	95% Jackknife UCL	68.03
		95% Standard Bootstrap UCL	67.13
Anderson-Darling Test Statistic	3.669	95% Bootstrap-t UCL	65.83
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	65.52
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	66.43
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	65.44
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.19
		97.5% Chebyshev(Mean, Sd) UCL	85.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	100.1
95% Approximate Gamma UCL	73.03		
95% Adjusted Gamma UCL	74.67		

Potential UCL to Use

Use 95% Student's-t UCL	68.03
or 95% Modified-t UCL	67.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0077	Minimum of Log Data	-4.867
Maximum	0.0913	Maximum of Log Data	-2.393
Mean	0.0495	Mean of log Data	-3.089
Median	0.0495	SD of log Data	0.517
SD	0.0158		
Coefficient of Variation	0.319		
Skewness	-3.11E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.434
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0567	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0694
95% Adjusted-CLT UCL (Chen-1995)	0.0562	95% Chebyshev (MVUE) UCL	0.0825
95% Modified-t UCL (Johnson-1978)	0.0567	97.5% Chebyshev (MVUE) UCL	0.0959
		99% Chebyshev (MVUE) UCL	0.122

Gamma Distribution Test

k star (bias corrected)	4.978	Data Distribution	
Theta Star	0.00995	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0495		
MLE of Standard Deviation	0.0222		
nu star	149.3		

Approximate Chi Square Value (.05)	122.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.0562
Adjusted Chi Square Value	119.1	95% Jackknife UCL	0.0567

Anderson-Darling Test Statistic	3.996	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.738	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.487	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.222	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.0673
		97.5% Chebyshev(Mean, Sd) UCL	0.075
		99% Chebyshev(Mean, Sd) UCL	0.0901

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0606		
95% Adjusted Gamma UCL	0.0621		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.0673

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-14.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	11500	Minimum of Log Data	9.35
Maximum	13400	Maximum of Log Data	9.503
Mean	12450	Mean of log Data	9.429
Median	12450	SD of log Data	0.0312
SD	387.8		
Coefficient of Variation	0.0312		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.574
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12642	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	12627	95% Chebyshev (MVUE) UCL	12920
95% Modified-t UCL (Johnson-1978)	12642	97.5% Chebyshev (MVUE) UCL	13124
		99% Chebyshev (MVUE) UCL	13523

Gamma Distribution Test

k star (bias corrected)	856.4	Data Distribution	
Theta Star	14.54	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	12450		
MLE of Standard Deviation	425.4		
nu star	22267		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301	Nonparametric Statistics	
Adjusted Chi Square Value	21872	95% CLT UCL	12627
		95% Jackknife UCL	12642

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.074	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.426	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	12919
		97.5% Chebyshev(Mean, Sd) UCL	13122
		99% Chebyshev(Mean, Sd) UCL	13520

Assuming Gamma Distribution

95% Approximate Gamma UCL	12646		
95% Adjusted Gamma UCL	12675		
Potential UCL to Use		Use 95% Student's-t UCL	12642
		or 95% Modified-t UCL	12642

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	7.57	Minimum of Log Data	2.024
Maximum	12.53	Maximum of Log Data	2.528
Mean	10.06	Mean of log Data	2.296
Median	10.32	SD of log Data	0.165
SD	1.608		
Coefficient of Variation	0.16		
Skewness	-0.21		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.953	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.98
95% Adjusted-CLT UCL (Chen-1995)	10.76	95% Chebyshev (MVUE) UCL	12.07
95% Modified-t UCL (Johnson-1978)	10.85	97.5% Chebyshev (MVUE) UCL	12.95
		99% Chebyshev (MVUE) UCL	14.66

Gamma Distribution Test

k star (bias corrected)	31.44	Data Distribution	
Theta Star	0.32	Data appear Normal at 5% Significance Level	
MLE of Mean	10.06		
MLE of Standard Deviation	1.794		
nu star	817.6		
Approximate Chi Square Value (.05)	752.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.79
Adjusted Chi Square Value	743.3	95% Jackknife UCL	10.85
		95% Standard Bootstrap UCL	10.77
Anderson-Darling Test Statistic	0.324	95% Bootstrap-t UCL	10.83
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	10.75
Kolmogorov-Smirnov Test Statistic	0.159	95% Percentile Bootstrap UCL	10.75
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	10.78
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12
		97.5% Chebyshev(Mean, Sd) UCL	12.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.5
95% Approximate Gamma UCL	10.93		
95% Adjusted Gamma UCL	11.06		

Potential UCL to Use		Use 95% Student's-t UCL	10.85
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	34.01	Minimum of Log Data	3.527
Maximum	85	Maximum of Log Data	4.443
Mean	52.33	Mean of log Data	3.912
Median	44.99	SD of log Data	0.304
SD	17.39		
Coefficient of Variation	0.332		
Skewness	1.098		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	60.93	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	61.97
95% Adjusted-CLT UCL (Chen-1995)	61.83	95% Chebyshev (MVUE) UCL	71.6
95% Modified-t UCL (Johnson-1978)	61.17	97.5% Chebyshev (MVUE) UCL	79.99
		99% Chebyshev (MVUE) UCL	96.48

Gamma Distribution Test

k star (bias corrected)	8.671	Data Distribution	
Theta Star	6.035	Data appear Lognormal at 5% Significance Level	
MLE of Mean	52.33		
MLE of Standard Deviation	17.77		
nu star	225.4		
Approximate Chi Square Value (.05)	191.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	60.26
Adjusted Chi Square Value	187.3	95% Jackknife UCL	60.93
		95% Standard Bootstrap UCL	59.85
Anderson-Darling Test Statistic	0.771	95% Bootstrap-t UCL	64.92
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	62.37
Kolmogorov-Smirnov Test Statistic	0.255	95% Percentile Bootstrap UCL	60.18
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	61.98
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	73.35
		97.5% Chebyshev(Mean, Sd) UCL	82.44
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	100.3
95% Approximate Gamma UCL	61.55		
95% Adjusted Gamma UCL	63		

Potential UCL to Use

Use 95% Student's-t UCL	60.93
or 95% Modified-t UCL	61.17
or 95% H-UCL	61.97

ProUCL computes and outputs H-statistic based UCLs for historical reasons only. H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide. It is therefore recommended to avoid the use of H-statistic based 95% UCLs. Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	170.7	Minimum of Log Data	5.14
Maximum	1420	Maximum of Log Data	7.258
Mean	519.5	Mean of log Data	6.102
Median	474.3	SD of log Data	0.561
SD	327		
Coefficient of Variation	0.63		
Skewness	1.875		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.827	Shapiro Wilk Test Statistic	0.982
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	681.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	745
95% Adjusted-CLT UCL (Chen-1995)	719.1	95% Chebyshev (MVUE) UCL	876.9
95% Modified-t UCL (Johnson-1978)	689.1	97.5% Chebyshev (MVUE) UCL	1033
		99% Chebyshev (MVUE) UCL	1340

Gamma Distribution Test

k star (bias corrected)	2.714	Data Distribution	
Theta Star	191.4	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	519.5		
MLE of Standard Deviation	315.3		
nu star	70.58		
Approximate Chi Square Value (.05)	52.24	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	668.7
Adjusted Chi Square Value	49.99	95% Jackknife UCL	681.2
		95% Standard Bootstrap UCL	665
Anderson-Darling Test Statistic	0.271	95% Bootstrap-t UCL	779.8
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	1321
Kolmogorov-Smirnov Test Statistic	0.147	95% Percentile Bootstrap UCL	666.4
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	732.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	914.9
		97.5% Chebyshev(Mean, Sd) UCL	1086
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1422
95% Approximate Gamma UCL	701.9		
95% Adjusted Gamma UCL	733.4		

Potential UCL to Use Use 95% Approximate Gamma UCL 701.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0332	Minimum of Log Data	-3.405
Maximum		10 Maximum of Log Data	2.303
Mean	8.386	Mean of log Data	1.446
Median		10 SD of log Data	2.068
SD	3.715		
Coefficient of Variation	0.443		
Skewness	-2.151		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.479	Shapiro Wilk Test Statistic	0.459
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.22	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	694.3
95% Adjusted-CLT UCL (Chen-1995)	9.424	95% Chebyshev (MVUE) UCL	92.81
95% Modified-t UCL (Johnson-1978)	10.12	97.5% Chebyshev (MVUE) UCL	122.3
		99% Chebyshev (MVUE) UCL	180.2

Gamma Distribution Test

k star (bias corrected)	0.715	Data Distribution	
Theta Star	11.72	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.386		
MLE of Standard Deviation	9.915		
nu star	18.6		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301	Nonparametric Statistics	
Adjusted Chi Square Value	8.93	95% CLT UCL	10.08
		95% Jackknife UCL	10.22
		95% Standard Bootstrap UCL	9.931

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.025	95% Bootstrap-t UCL	9.665
Anderson-Darling 5% Critical Value	0.764	95% Hall's Bootstrap UCL	9.494
Kolmogorov-Smirnov Test Statistic	0.51	95% Percentile Bootstrap UCL	9.837
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	9.235
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.88
		97.5% Chebyshev(Mean, Sd) UCL	14.82
		99% Chebyshev(Mean, Sd) UCL	18.64

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.87
95% Adjusted Gamma UCL	17.47

Potential UCL to Use

	Use 99% Chebyshev (Mean, Sd) UCL	18.64
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics

Minimum	11	Minimum of Log Data	2.398
Maximum	70.85	Maximum of Log Data	4.261
Mean	57.2	Mean of log Data	3.913
Median	65	SD of log Data	0.657
SD	20.39		
Coefficient of Variation	0.356		
Skewness	-2.148		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.496	Shapiro Wilk Test Statistic	0.472
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.28	95% H-UCL	96.35
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	111.4
95% Adjusted-CLT UCL (Chen-1995)	62.91	97.5% Chebyshev (MVUE) UCL	133.2
95% Modified-t UCL (Johnson-1978)	66.72	99% Chebyshev (MVUE) UCL	176.1

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	3.054	Data Distribution	
Theta Star	18.73	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	57.2		
MLE of Standard Deviation	32.73		
nu star	79.41		
Approximate Chi Square Value (.05)	59.88	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	66.51
Adjusted Chi Square Value	57.47	95% Jackknife UCL	67.28
		95% Standard Bootstrap UCL	66.08
Anderson-Darling Test Statistic	3.641	95% Bootstrap-t UCL	64.09
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	63.21
Kolmogorov-Smirnov Test Statistic	0.511	95% Percentile Bootstrap UCL	65.45
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	62.2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.86
		97.5% Chebyshev(Mean, Sd) UCL	92.52
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	113.5
95% Approximate Gamma UCL	75.86		
95% Adjusted Gamma UCL	79.05		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 81.86
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	30.8	Minimum of Log Data	3.428
Maximum	38	Maximum of Log Data	3.638
Mean	34.4	Mean of log Data	3.537
Median	34.4	SD of log Data	0.0429
SD	1.47		
Coefficient of Variation	0.0427		
Skewness	2.14E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.573
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	35.13	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	35.07	95% Chebyshev (MVUE) UCL	36.19
95% Modified-t UCL (Johnson-1978)	35.13	97.5% Chebyshev (MVUE) UCL	36.96
		99% Chebyshev (MVUE) UCL	38.48

Gamma Distribution Test

k star (bias corrected)	454.2	Data Distribution	
Theta Star	0.0757	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	34.4		
MLE of Standard Deviation	1.614		
nu star	11810		
Approximate Chi Square Value (.05)	11558	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	35.07
Adjusted Chi Square Value	11523	95% Jackknife UCL	35.13

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.075	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.429	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	36.18
		97.5% Chebyshev(Mean, Sd) UCL	36.95
		99% Chebyshev(Mean, Sd) UCL	38.46

Assuming Gamma Distribution

95% Approximate Gamma UCL	35.15
95% Adjusted Gamma UCL	35.26

Potential UCL to Use

Use 95% Student's-t UCL	35.13
or 95% Modified-t UCL	35.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-15.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	13
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.55	Minimum of Log Data	1.714
Maximum	11.74	Maximum of Log Data	2.463
Mean	8.086	Mean of log Data	2.063
Median	8.086	SD of log Data	0.237
SD	1.967		
Coefficient of Variation	0.243		
Skewness	0.606		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.911	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.948	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.053
95% Adjusted-CLT UCL (Chen-1995)	8.974	95% Chebyshev (MVUE) UCL	10.18
95% Modified-t UCL (Johnson-1978)	8.96	97.5% Chebyshev (MVUE) UCL	11.09
		99% Chebyshev (MVUE) UCL	12.88

Gamma Distribution Test

k star (bias corrected)	15.37	Data Distribution	
Theta Star	0.526	Data appear Normal at 5% Significance Level	
MLE of Mean	8.086		
MLE of Standard Deviation	2.062		
nu star	492		
Approximate Chi Square Value (.05)	441.5	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	8.895
Adjusted Chi Square Value	436.1	95% Jackknife UCL	8.948
		95% Standard Bootstrap UCL	8.87
Anderson-Darling Test Statistic	0.477	95% Bootstrap-t UCL	9.013
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	8.945
Kolmogorov-Smirnov Test Statistic	0.154	95% Percentile Bootstrap UCL	8.857
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	8.991
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.23
		97.5% Chebyshev(Mean, Sd) UCL	11.16
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.98
95% Approximate Gamma UCL	9.01		
95% Adjusted Gamma UCL	9.122		
Potential UCL to Use		Use 95% Student's-t UCL	8.948

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 12

Raw Statistics

Minimum	34.12	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.53
Mean	54.93	Maximum of Log Data	4.443
Median	51	Mean of log Data	3.968
SD	16.4	SD of log Data	0.277
Coefficient of Variation	0.299		
Skewness	1.069		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.84	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	62.12	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	62.78
95% Adjusted-CLT UCL (Chen-1995)	62.85	95% Chebyshev (MVUE) UCL	71.58
95% Modified-t UCL (Johnson-1978)	62.3	97.5% Chebyshev (MVUE) UCL	78.83
		99% Chebyshev (MVUE) UCL	93.06

Gamma Distribution Test

k star (bias corrected)	10.94	Data Distribution	
Theta Star	5.019	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	54.93		
MLE of Standard Deviation	16.6		
nu star	350.2	Nonparametric Statistics	
Approximate Chi Square Value (.05)	307.9	95% CLT UCL	61.68
Adjusted Level of Significance	0.034	95% Jackknife UCL	62.12
Adjusted Chi Square Value	303.3	95% Standard Bootstrap UCL	61.5
Anderson-Darling Test Statistic	0.749	95% Bootstrap-t UCL	63.69
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	62.21
Kolmogorov-Smirnov Test Statistic	0.214	95% Percentile Bootstrap UCL	61.68
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	62.7
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	72.8
		97.5% Chebyshev(Mean, Sd) UCL	80.54
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	95.73
95% Approximate Gamma UCL	62.49		
95% Adjusted Gamma UCL	63.42		

Potential UCL to Use Use 95% Approximate Gamma UCL 62.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 14

Raw Statistics

	Log-transformed Statistics	
Minimum	195.9 Minimum of Log Data	5.278
Maximum	929.7 Maximum of Log Data	6.835
Mean	517.9 Mean of log Data	6.171
Median	497.6 SD of log Data	0.418
SD	209.4	
Coefficient of Variation	0.404	
Skewness	0.765	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.897 Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	609.7 95% H-UCL	646.7
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	761.9
95% Adjusted-CLT UCL (Chen-1995)	614.7 97.5% Chebyshev (MVUE) UCL	866.8
95% Modified-t UCL (Johnson-1978)	611.3 99% Chebyshev (MVUE) UCL	1073

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	5.357 Data appear Normal at 5% Significance Level	
Theta Star	96.67	
MLE of Mean	517.9	
MLE of Standard Deviation	223.8	
nu star	171.4	
Approximate Chi Square Value (.05)	142.2 Nonparametric Statistics	
Adjusted Level of Significance	0.034 95% CLT UCL	604
Adjusted Chi Square Value	139.1 95% Jackknife UCL	609.7
	95% Standard Bootstrap UCL	601
Anderson-Darling Test Statistic	0.537 95% Bootstrap-t UCL	629.1
Anderson-Darling 5% Critical Value	0.741 95% Hall's Bootstrap UCL	619.5
Kolmogorov-Smirnov Test Statistic	0.198 95% Percentile Bootstrap UCL	605.2
Kolmogorov-Smirnov 5% Critical Value	0.216 95% BCA Bootstrap UCL	610.3
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	746.1
	97.5% Chebyshev(Mean, Sd) UCL	844.9
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1039
95% Approximate Gamma UCL	624.6	
95% Adjusted Gamma UCL	638.2	

Potential UCL to Use Use 95% Student's-t UCL 609.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics

Minimum	6.7	Minimum of Log Data	1.902
Maximum	88.34	Maximum of Log Data	4.481
Mean	62.31	Mean of log Data	4.044
Median	65	SD of log Data	0.577
SD	16.02		
Coefficient of Variation	0.257		
Skewness	-2.856		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.488	Shapiro Wilk Test Statistic	0.358
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.33	95% H-UCL	92.53
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	110.1
95% Adjusted-CLT UCL (Chen-1995)	65.84	97.5% Chebyshev (MVUE) UCL	128.9
95% Modified-t UCL (Johnson-1978)	68.86	99% Chebyshev (MVUE) UCL	166

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	4.763	Data Distribution	
Theta Star	13.08	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	62.31		
MLE of Standard Deviation	28.55		
nu star	152.4		
Approximate Chi Square Value (.05)	124.9	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	68.9
Adjusted Chi Square Value	122	95% Jackknife UCL	69.33
		95% Standard Bootstrap UCL	68.81
Anderson-Darling Test Statistic	4.544	95% Bootstrap-t UCL	67.15
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	66.6
Kolmogorov-Smirnov Test Statistic	0.493	95% Percentile Bootstrap UCL	67.58
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	66.74
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	79.77
		97.5% Chebyshev(Mean, Sd) UCL	87.32
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	102.2
95% Approximate Gamma UCL	76.05		
95% Adjusted Gamma UCL	77.82		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	79.77

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.031	Minimum of Log Data	-3.474
Maximum	11.68	Maximum of Log Data	2.458
Mean	9.362	Mean of log Data	1.939
Median		10 SD of log Data	1.444
SD	2.542		
Coefficient of Variation	0.272		
Skewness	-3.698		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.42	Shapiro Wilk Test Statistic	0.297
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995)
 95% Modified-t UCL (Johnson-1978)

Assuming Lognormal Distribution

10.48	95% H-UCL	71.25
	95% Chebyshev (MVUE) UCL	49.39
9.78	97.5% Chebyshev (MVUE) UCL	63.15
10.38	99% Chebyshev (MVUE) UCL	90.19

Gamma Distribution Test

k star (bias corrected) 1.527
 Theta Star 6.131
 MLE of Mean 9.362
 MLE of Standard Deviation 7.577
 nu star 48.86

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)	33.82	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	10.41
Adjusted Chi Square Value	32.39	95% Jackknife UCL	10.48
		95% Standard Bootstrap UCL	10.34
Anderson-Darling Test Statistic	5.385	95% Bootstrap-t UCL	10.09
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	10
Kolmogorov-Smirnov Test Statistic	0.536	95% Percentile Bootstrap UCL	10.13
Kolmogorov-Smirnov 5% Critical Value	0.218	95% BCA Bootstrap UCL	10.03
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.13
		97.5% Chebyshev(Mean, Sd) UCL	13.33
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.69
95% Approximate Gamma UCL	13.53		
95% Adjusted Gamma UCL	14.12		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.13
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-16.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.23	Minimum of Log Data	-1.47
Maximum	0.74	Maximum of Log Data	-0.301
Mean	0.467	Mean of log Data	-0.783
Median	0.467	SD of log Data	0.218
SD	0.0938		
Coefficient of Variation	0.201		
Skewness	0.656		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.552	Shapiro Wilk Test Statistic	0.535
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.508	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.518
95% Adjusted-CLT UCL (Chen-1995)	0.509	95% Chebyshev (MVUE) UCL	0.579
95% Modified-t UCL (Johnson-1978)	0.508	97.5% Chebyshev (MVUE) UCL	0.628
		99% Chebyshev (MVUE) UCL	0.723

Gamma Distribution Test

k star (bias corrected)	19.97	Data Distribution	
Theta Star	0.0234	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.467		
MLE of Standard Deviation	0.104		
nu star	639.1		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0335	Nonparametric Statistics	
Adjusted Chi Square Value	575.2	95% CLT UCL	0.505
		95% Jackknife UCL	0.508
		95% Standard Bootstrap UCL	0.505

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.759	95% Bootstrap-t UCL	0.51
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	0.535
Kolmogorov-Smirnov Test Statistic	0.411	95% Percentile Bootstrap UCL	0.501
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	0.511
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.569
		97.5% Chebyshev(Mean, Sd) UCL	0.613
		99% Chebyshev(Mean, Sd) UCL	0.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.513		
95% Adjusted Gamma UCL	0.519		
Potential UCL to Use		Use 95% Student's-t UCL	0.508
		or 95% Modified-t UCL	0.508

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 14

Raw Statistics

	Log-transformed Statistics	
Minimum	5.33 Minimum of Log Data	1.673
Maximum	17.8 Maximum of Log Data	2.879
Mean	9.468 Mean of log Data	2.193
Median	9.04 SD of log Data	0.339
SD	3.335	
Coefficient of Variation	0.352	
Skewness	1.016	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.916 Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.93 95% H-UCL	11.21
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	13
95% Adjusted-CLT UCL (Chen-1995)	11.07 97.5% Chebyshev (MVUE) UCL	14.54
95% Modified-t UCL (Johnson-1978)	10.97 99% Chebyshev (MVUE) UCL	17.55

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.614 Data appear Normal at 5% Significance Level	
Theta Star	1.244	
MLE of Mean	9.468	
MLE of Standard Deviation	3.431	
nu star	243.6	
Approximate Chi Square Value (.05)	208.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	10.84
Adjusted Chi Square Value	204.8 95% Jackknife UCL	10.93
	95% Standard Bootstrap UCL	10.79
Anderson-Darling Test Statistic	0.293 95% Bootstrap-t UCL	11.23
Anderson-Darling 5% Critical Value	0.739 95% Hall's Bootstrap UCL	11.6
Kolmogorov-Smirnov Test Statistic	0.135 95% Percentile Bootstrap UCL	10.87
Kolmogorov-Smirnov 5% Critical Value	0.215 95% BCA Bootstrap UCL	11.05
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	13.1
	97.5% Chebyshev(Mean, Sd) UCL	14.68
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	17.77
95% Approximate Gamma UCL	11.06	
95% Adjusted Gamma UCL	11.26	

Potential UCL to Use Use 95% Student's-t UCL 10.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.45 Minimum of Log Data	-0.799
Maximum	0.87 Maximum of Log Data	-0.139
Mean	0.61 Mean of log Data	-0.502
Median	0.61 SD of log Data	0.129
SD	0.0829	
Coefficient of Variation	0.136	
Skewness	1.666	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.583 Shapiro Wilk Test Statistic	0.616
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	Assuming Lognormal Distribution	
0.646	95% H-UCL	0.647
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.696
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	0.733
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	0.806

Gamma Distribution Test

k star (bias corrected)	Data Distribution	
0.012	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	50.87	
MLE of Standard Deviation	0.012	
nu star	0.61	
Approximate Chi Square Value (.05)	0.0855	
Adjusted Level of Significance	1628	
Adjusted Chi Square Value	1535 Nonparametric Statistics	
	95% CLT UCL	0.644
	95% Jackknife UCL	0.646
	95% Standard Bootstrap UCL	0.643
	95% Bootstrap-t UCL	0.655
	95% Hall's Bootstrap UCL	0.85
	95% Percentile Bootstrap UCL	0.646
	95% BCA Bootstrap UCL	0.649
	95% Chebyshev(Mean, Sd) UCL	0.7
	97.5% Chebyshev(Mean, Sd) UCL	0.739
	99% Chebyshev(Mean, Sd) UCL	0.816

Anderson-Darling Test Statistic

3.324	95% CLT UCL	0.644
Anderson-Darling 5% Critical Value	95% Jackknife UCL	0.646
0.736	95% Standard Bootstrap UCL	0.643
Kolmogorov-Smirnov Test Statistic	95% Bootstrap-t UCL	0.655
0.421	95% Hall's Bootstrap UCL	0.85
Kolmogorov-Smirnov 5% Critical Value	95% Percentile Bootstrap UCL	0.646
0.214	95% BCA Bootstrap UCL	0.649
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.7
	97.5% Chebyshev(Mean, Sd) UCL	0.739
	99% Chebyshev(Mean, Sd) UCL	0.816

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.647	
95% Adjusted Gamma UCL	0.651	

Potential UCL to Use

Use 95% Student's-t UCL	0.646
or 95% Modified-t UCL	0.648

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 14

Raw Statistics

	Log-transformed Statistics	
Minimum	12.7 Minimum of Log Data	2.542
Maximum	85 Maximum of Log Data	4.443
Mean	48.45 Mean of log Data	3.795
Median	44.24 SD of log Data	0.451
SD	20.1	
Coefficient of Variation	0.415	
Skewness	0.869	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.824 Shapiro Wilk Test Statistic	0.833
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	57.26 95% H-UCL	62.12
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	73.51
95% Adjusted-CLT UCL (Chen-1995)	57.88 97.5% Chebyshev (MVUE) UCL	84.17
95% Modified-t UCL (Johnson-1978)	57.44 99% Chebyshev (MVUE) UCL	105.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.91 Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.868	
MLE of Mean	48.45	
MLE of Standard Deviation	21.87	
nu star	157.1	
Approximate Chi Square Value (.05)	129.1 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	56.71
Adjusted Chi Square Value	126.2 95% Jackknife UCL	57.26
	95% Standard Bootstrap UCL	56.36
Anderson-Darling Test Statistic	1.063 95% Bootstrap-t UCL	58.3
Anderson-Darling 5% Critical Value	0.741 95% Hall's Bootstrap UCL	58.5
Kolmogorov-Smirnov Test Statistic	0.22 95% Percentile Bootstrap UCL	56.74
Kolmogorov-Smirnov 5% Critical Value	0.216 95% BCA Bootstrap UCL	58.01
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	70.35
	97.5% Chebyshev(Mean, Sd) UCL	79.83
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	98.44
95% Approximate Gamma UCL	58.95	
95% Adjusted Gamma UCL	60.29	

Potential UCL to Use

Use 95% Student's-t UCL 57.26
or 95% Modified-t UCL 57.44

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 16

Raw Statistics

	Log-transformed Statistics	
Minimum	203.4 Minimum of Log Data	5.315
Maximum	3861 Maximum of Log Data	8.259
Mean	715.2 Mean of log Data	6.21
Median	427.7 SD of log Data	0.73
SD	922	
Coefficient of Variation	1.289	
Skewness	3.124	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.507 Shapiro Wilk Test Statistic	0.79
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1119 95% H-UCL	1006
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1174
95% Adjusted-CLT UCL (Chen-1995)	1287 97.5% Chebyshev (MVUE) UCL	1407
95% Modified-t UCL (Johnson-1978)	1149 99% Chebyshev (MVUE) UCL	1864

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.28 Data do not follow a Discernable Distribution (0.05)	
Theta Star	558.7	
MLE of Mean	715.2	
MLE of Standard Deviation	632.1	
nu star	40.96	
Approximate Chi Square Value (.05)	27.29 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	1094
Adjusted Chi Square Value	26.02 95% Jackknife UCL	1119
	95% Standard Bootstrap UCL	1078
Anderson-Darling Test Statistic	2.151 95% Bootstrap-t UCL	3283
Anderson-Darling 5% Critical Value	0.754 95% Hall's Bootstrap UCL	3387
Kolmogorov-Smirnov Test Statistic	0.361 95% Percentile Bootstrap UCL	1119
Kolmogorov-Smirnov 5% Critical Value	0.219 95% BCA Bootstrap UCL	1431
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1720
	97.5% Chebyshev(Mean, Sd) UCL	2155
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	3009
95% Approximate Gamma UCL	1073	
95% Adjusted Gamma UCL	1126	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1720

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	8.5 Minimum of Log Data	2.14
Maximum	108.4 Maximum of Log Data	4.686
Mean	60.63 Mean of log Data	3.952
Median	65 SD of log Data	0.718
SD	23.17	
Coefficient of Variation	0.382	
Skewness	-1.048	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.666 Shapiro Wilk Test Statistic	0.527
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	70.79 95% H-UCL	103.1
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	120.7
95% Adjusted-CLT UCL (Chen-1995)	68.54 97.5% Chebyshev (MVUE) UCL	144.3
95% Modified-t UCL (Johnson-1978)	70.54 99% Chebyshev (MVUE) UCL	190.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.822 Data do not follow a Discernable Distribution (0.05)	
Theta Star	21.49	
MLE of Mean	60.63	
MLE of Standard Deviation	36.09	
nu star	90.3	
Approximate Chi Square Value (.05)	69.39 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	70.16
Adjusted Chi Square Value	67.3 95% Jackknife UCL	70.79
	95% Standard Bootstrap UCL	70
Anderson-Darling Test Statistic	3.602 95% Bootstrap-t UCL	69.07
Anderson-Darling 5% Critical Value	0.743 95% Hall's Bootstrap UCL	69.23
Kolmogorov-Smirnov Test Statistic	0.434 95% Percentile Bootstrap UCL	69.96
Kolmogorov-Smirnov 5% Critical Value	0.216 95% BCA Bootstrap UCL	68.59
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	85.89
	97.5% Chebyshev(Mean, Sd) UCL	96.81
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	118.3
95% Approximate Gamma UCL	78.9	
95% Adjusted Gamma UCL	81.35	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 85.89

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	0.028 Minimum of Log Data	-3.576
Maximum	12.32 Maximum of Log Data	2.511
Mean	9.04 Mean of log Data	1.604
Median	10 SD of log Data	1.991
SD	3.579	
Coefficient of Variation	0.396	
Skewness	-2.322	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.539 Shapiro Wilk Test Statistic	0.424
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.61 95% H-UCL	356.5
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	95.86
95% Adjusted-CLT UCL (Chen-1995)	9.957 97.5% Chebyshev (MVUE) UCL	125.6
95% Modified-t UCL (Johnson-1978)	10.52 99% Chebyshev (MVUE) UCL	184.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.83 Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.89	
MLE of Mean	9.04	
MLE of Standard Deviation	9.924	
nu star	26.55	
Approximate Chi Square Value (.05)	15.81 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	10.51
Adjusted Chi Square Value	14.87 95% Jackknife UCL	10.61
	95% Standard Bootstrap UCL	10.49
Anderson-Darling Test Statistic	4.963 95% Bootstrap-t UCL	10.24
Anderson-Darling 5% Critical Value	0.765 95% Hall's Bootstrap UCL	10.05
Kolmogorov-Smirnov Test Statistic	0.545 95% Percentile Bootstrap UCL	10.35
Kolmogorov-Smirnov 5% Critical Value	0.221 95% BCA Bootstrap UCL	10.14
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.94
	97.5% Chebyshev(Mean, Sd) UCL	14.63
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	17.94
95% Approximate Gamma UCL	15.19	
95% Adjusted Gamma UCL	16.15	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.94
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.14 Minimum of Log Data	-1.966
Maximum	0.63 Maximum of Log Data	-0.462
Mean	0.34 Mean of log Data	-1.115
Median	0.34 SD of log Data	0.288
SD	0.0939	
Coefficient of Variation	0.276	
Skewness	1.442	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.582 Shapiro Wilk Test Statistic	0.598
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.381 95% H-UCL	0.392
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.449
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL	0.496
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL	0.588

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	11.42 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0298	
MLE of Mean	0.34	
MLE of Standard Deviation	0.101	
nu star	365.5	
Approximate Chi Square Value (.05)	322.2 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	0.379
Adjusted Chi Square Value	317.5 95% Jackknife UCL	0.381
	95% Standard Bootstrap UCL	0.379
Anderson-Darling Test Statistic	3.361 95% Bootstrap-t UCL	0.388
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	0.603
Kolmogorov-Smirnov Test Statistic	0.411 95% Percentile Bootstrap UCL	0.378
Kolmogorov-Smirnov 5% Critical Value	0.215 95% BCA Bootstrap UCL	0.389
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.442
	97.5% Chebyshev(Mean, Sd) UCL	0.487
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.574
95% Approximate Gamma UCL	0.386	
95% Adjusted Gamma UCL	0.391	

Potential UCL to Use Use 95% Student's-t UCL 0.381
 or 95% Modified-t UCL 0.383

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	24.9	Minimum of Log Data	3.215
Maximum	41.1	Maximum of Log Data	3.716
Mean	31	Mean of log Data	3.429
Median	31	SD of log Data	0.0988
SD	3.217		
Coefficient of Variation	0.104		
Skewness	1.692		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.582	Shapiro Wilk Test Statistic	0.61
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	32.41	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	34.34
95% Adjusted-CLT UCL (Chen-1995)	32.69	97.5% Chebyshev (MVUE) UCL	35.78
95% Modified-t UCL (Johnson-1978)	32.47	99% Chebyshev (MVUE) UCL	38.62

Gamma Distribution Test

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	86.56	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.358		
MLE of Mean	31		
MLE of Standard Deviation	3.332		
nu star	2770		
Approximate Chi Square Value (.05)	2649	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	32.32
Adjusted Chi Square Value	2635	95% Jackknife UCL	32.41
		95% Standard Bootstrap UCL	32.3

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.334	95% Bootstrap-t UCL	32.75
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	40.25
Kolmogorov-Smirnov Test Statistic	0.425	95% Percentile Bootstrap UCL	32.26
Kolmogorov-Smirnov 5% Critical Value	0.214	95% BCA Bootstrap UCL	32.51
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	34.51
		97.5% Chebyshev(Mean, Sd) UCL	36.02
		99% Chebyshev(Mean, Sd) UCL	39

Assuming Gamma Distribution

95% Approximate Gamma UCL	32.42
95% Adjusted Gamma UCL	32.59

Potential UCL to Use

Use 95% Student's-t UCL	32.41
or 95% Modified-t UCL	32.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-17.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	6.05	Log-transformed Statistics	
Maximum	13.96	Minimum of Log Data	1.8
Mean	10.05	Maximum of Log Data	2.636
Median	10.05	Mean of log Data	2.284
SD	2.125	SD of log Data	0.235
Coefficient of Variation	0.211		
Skewness	-0.538		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.882	Shapiro Wilk Test Statistic	0.829
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.52
95% Adjusted-CLT UCL (Chen-1995)	10.96	95% Chebyshev (MVUE) UCL	13.06
95% Modified-t UCL (Johnson-1978)	11.14	97.5% Chebyshev (MVUE) UCL	14.36
		99% Chebyshev (MVUE) UCL	16.9

Gamma Distribution Test

k star (bias corrected)	16.18	Data Distribution	
Theta Star	0.621	Data appear Normal at 5% Significance Level	
MLE of Mean	10.05		
MLE of Standard Deviation	2.499		
nu star	388.3		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.029	Nonparametric Statistics	
Adjusted Chi Square Value	337.2	95% CLT UCL	11.06
		95% Jackknife UCL	11.15
		95% Standard Bootstrap UCL	11.01

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.964	95% Bootstrap-t UCL	11.02
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	11.06
Kolmogorov-Smirnov Test Statistic	0.279	95% Percentile Bootstrap UCL	11.04
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.93
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.72

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.36	97.5% Chebyshev(Mean, Sd) UCL	13.88
95% Adjusted Gamma UCL	11.57	99% Chebyshev(Mean, Sd) UCL	16.15
Potential UCL to Use		Use 95% Student's-t UCL	11.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	1.1	Maximum of Log Data	0.0953
Mean	0.565	Mean of log Data	-0.76
Median	0.565	SD of log Data	0.886
SD	0.228		
Coefficient of Variation	0.404		
Skewness	2.55E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.45
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.683	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.429
95% Adjusted-CLT UCL (Chen-1995)	0.673	95% Chebyshev (MVUE) UCL	1.448
95% Modified-t UCL (Johnson-1978)	0.683	97.5% Chebyshev (MVUE) UCL	1.787
		99% Chebyshev (MVUE) UCL	2.453

Gamma Distribution Test

k star (bias corrected)	2.155	Data Distribution	
Theta Star	0.262	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.565		
MLE of Standard Deviation	0.385		
nu star	51.72		
Approximate Chi Square Value (.05)	36.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.673
Adjusted Chi Square Value	34.23	95% Jackknife UCL	0.683
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.068	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.496	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.852
		97.5% Chebyshev(Mean, Sd) UCL	0.976
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.22
95% Approximate Gamma UCL	0.807		
95% Adjusted Gamma UCL	0.854		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.852

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	-0.009
Maximum	0.332
Mean	0.162
Median	0.162
SD	0.0727
Coefficient of Variation	0.45
Skewness	0

Log-transformed Statistics

Log Statistics Not Available

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.6 Not Available
Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.199
Assuming Normal Distribution	
95% Student's-t UCL	0.199

Assuming Lognormal Distribution

95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen 1995)	0.196
95% Modified-t UCL (Johnson-1978)	0.199

Gamma Distribution Test

Gamma Statistics Not Available	Data Distribution
	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.253	95% CLT UCL	0.196
		95% Jackknife UCL	0.199
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.253
		97.5% Chebyshev(Mean, Sd) UCL	0.293
		99% Chebyshev(Mean, Sd) UCL	0.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

Minimum	16.4	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.797
Mean	46.07	Maximum of Log Data	4.443
Median	46.07	Mean of log Data	3.766
SD	16.34	SD of log Data	0.395
Coefficient of Variation	3.55E-01		
Skewness	0.717		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.877	Shapiro Wilk Test Statistic	0.857
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	54.54	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	59.43
95% Adjusted-CLT UCL (Chen-1995)	54.87	95% Chebyshev (MVUE) UCL	69.82
95% Modified-t UCL (Johnson-1978)	54.7	97.5% Chebyshev (MVUE) UCL	79.96
		99% Chebyshev (MVUE) UCL	99.87

Gamma Distribution Test

k star (bias corrected)	6.016	Data Distribution	
Theta Star	7.657	Data appear Normal at 5% Significance Level	
MLE of Mean	46.07		
MLE of Standard Deviation	18.78		
nu star	144.4		
Approximate Chi Square Value (.05)	117.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	53.82
Adjusted Chi Square Value	113.9	95% Jackknife UCL	54.54
		95% Standard Bootstrap UCL	53.4
Anderson-Darling Test Statistic	0.82	95% Bootstrap-t UCL	55.45
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	60.64
Kolmogorov-Smirnov Test Statistic	0.287	95% Percentile Bootstrap UCL	53.79
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	54.67
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	66.63
		97.5% Chebyshev(Mean, Sd) UCL	75.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	93
95% Approximate Gamma UCL	56.55		
95% Adjusted Gamma UCL	58.38		

Potential UCL to Use

Use 95% Student's-t UCL 54.54

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

Minimum	7.7	Log-transformed Statistics	
Maximum	69.36	Minimum of Log Data	2.041
Mean	51.51	Maximum of Log Data	4.239
Median	58.25	Mean of log Data	3.768
SD	21.04	SD of log Data	0.757
Coefficient of Variation	0.409		
Skewness	-1.611		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.715	Shapiro Wilk Test Statistic	0.601
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	62.42	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	102
95% Adjusted-CLT UCL (Chen-1995)	58.48	95% Chebyshev (MVUE) UCL	111.9
95% Modified-t UCL (Johnson-1978)	61.95	97.5% Chebyshev (MVUE) UCL	136.1
		99% Chebyshev (MVUE) UCL	183.6

Gamma Distribution Test

k star (bias corrected)	2.338	Data Distribution	
Theta Star	22.03	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	51.51		
MLE of Standard Deviation	33.69		
nu star	56.1	Nonparametric Statistics	
Approximate Chi Square Value (.05)	39.89	95% CLT UCL	61.5
Adjusted Level of Significance	0.029	95% Jackknife UCL	62.42
Adjusted Chi Square Value	37.81	95% Standard Bootstrap UCL	61.13
		95% Bootstrap-t UCL	59.85
Anderson-Darling Test Statistic	2.133	95% Hall's Bootstrap UCL	58.75
Anderson-Darling 5% Critical Value	0.739	95% Percentile Bootstrap UCL	60.47
Kolmogorov-Smirnov Test Statistic	0.41	95% BCA Bootstrap UCL	58.7
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Chebyshev(Mean, Sd) UCL	77.99
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	89.44
		99% Chebyshev(Mean, Sd) UCL	111.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL	72.45		
95% Adjusted Gamma UCL	76.43		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 77.99

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0187	Minimum of Log Data	-3.979
Maximum	0.159	Maximum of Log Data	-1.841
Mean	0.0887	Mean of log Data	-2.504
Median	0.0887	SD of log Data	0.494
SD	0.0298		
Coefficient of Variation	0.336		
Skewness	8.90E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.511
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.104	95% H-UCL	0.127
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.149
95% Adjusted-CLT UCL (Chen-1995)	0.103	97.5% Chebyshev (MVUE) UCL	0.175
95% Modified-t UCL (Johnson-1978)	0.104	99% Chebyshev (MVUE) UCL	0.224

Gamma Distribution Test

k star (bias corrected)	4.793	Data Distribution	
Theta Star	0.0185	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0887		
MLE of Standard Deviation	0.0405		
nu star	115		
Approximate Chi Square Value (.05)	91.28	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.103
Adjusted Chi Square Value	88.05	95% Jackknife UCL	0.104

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.867	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.47	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.126
		97.5% Chebyshev(Mean, Sd) UCL	0.142
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.174
95% Approximate Gamma UCL	0.112		
95% Adjusted Gamma UCL	0.116		

Potential UCL to Use

Use 95% Student's-t UCL	0.104
or 95% Modified-t UCL	0.104

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-18.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics		Log-transformed Statistics	
Minimum	11800	Minimum of Log Data	9.376
Maximum	19800	Maximum of Log Data	9.893
Mean	15800	Mean of log Data	9.662
Median	15800	SD of log Data	0.111
SD	1706		
Coefficient of Variation	0.108		
Skewness	0		

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.591
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	16684	95% H-UCL	16783
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18014
95% Adjusted-CLT UCL (Chen-1995)	16610	97.5% Chebyshev (MVUE) UCL	18971
95% Modified-t UCL (Johnson-1978)	16684	99% Chebyshev (MVUE) UCL	20851

Gamma Distribution Test

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	68.12	Data do not follow a Discernable Distribution (0.05)	
Theta Star	232		
MLE of Mean	15800		
MLE of Standard Deviation	1914		
nu star	1635		
Approximate Chi Square Value (.05)	1542	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	16610
Adjusted Chi Square Value	1528	95% Jackknife UCL	16684
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.724	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.431	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17946
		97.5% Chebyshev(Mean, Sd) UCL	18875
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20699
95% Approximate Gamma UCL	16752		
95% Adjusted Gamma UCL	16903		

Potential UCL to Use

Use 95% Student's-t UCL	16684
or 95% Modified-t UCL	16684

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.49	Minimum of Log Data	-0.713
Maximum	0.66	Maximum of Log Data	-0.416
Mean	0.575	Mean of log Data	-0.555
Median	0.575	SD of log Data	0.0636
SD	0.0362		
Coefficient of Variation	0.063		
Skewness	-5.47E-15		

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.597
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.594	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.621
95% Adjusted-CLT UCL (Chen-1995)	0.592	97.5% Chebyshev (MVUE) UCL	0.641
95% Modified-t UCL (Johnson-1978)	0.594	99% Chebyshev (MVUE) UCL	0.68

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	203.8	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00282		
MLE of Mean	0.575		
MLE of Standard Deviation	0.0403		
nu star	4892		
Approximate Chi Square Value (.05)	4731	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.592
Adjusted Chi Square Value	4707	95% Jackknife UCL	0.594
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.717	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.425	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.621
		97.5% Chebyshev(Mean, Sd) UCL	0.64
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.679
95% Approximate Gamma UCL	0.595		
95% Adjusted Gamma UCL	0.598		

Potential UCL to Use

Use 95% Student's-t UCL	0.594
or 95% Modified-t UCL	0.594

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	7.29	Minimum of Log Data	1.987
Maximum	16.81	Maximum of Log Data	2.822
Mean	10.39	Mean of log Data	2.309
Median	9.325	SD of log Data	0.256
SD	2.869		
Coefficient of Variation	0.276		
Skewness	1.154		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	11.87	95% H-UCL	12.03
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.73
95% Adjusted-CLT UCL (Chen-1995)	12.04	97.5% Chebyshev (MVUE) UCL	15.19
95% Modified-t UCL (Johnson-1978)	11.92	99% Chebyshev (MVUE) UCL	18.05

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	12.08	Data appear Normal at 5% Significance Level	
Theta Star	0.86		
MLE of Mean	10.39		
MLE of Standard Deviation	2.988		
nu star	289.9		
Approximate Chi Square Value (.05)	251.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.75
Adjusted Chi Square Value	246	95% Jackknife UCL	11.87
		95% Standard Bootstrap UCL	11.7
Anderson-Darling Test Statistic	0.454	95% Bootstrap-t UCL	12.32
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	12.17
Kolmogorov-Smirnov Test Statistic	0.19	95% Percentile Bootstrap UCL	11.78
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	12
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14
		97.5% Chebyshev(Mean, Sd) UCL	15.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.63
95% Approximate Gamma UCL	11.97		
95% Adjusted Gamma UCL	12.24		

Potential UCL to Use Use 95% Student's-t UCL 11.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.69	Minimum of Log Data	-0.371
Maximum	0.74	Maximum of Log Data	-0.301
Mean	0.715	Mean of log Data	-0.336
Median	0.715	SD of log Data	0.0149
SD	0.0107		
Coefficient of Variation	0.0149		
Skewness	3.75E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.721	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.72	95% Chebyshev (MVUE) UCL	0.728
95% Modified-t UCL (Johnson-1978)	0.721	97.5% Chebyshev (MVUE) UCL	0.734
		99% Chebyshev (MVUE) UCL	0.746

Gamma Distribution Test

k star (bias corrected)	3679	Data Distribution	
Theta Star	1.94E-04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.715		
MLE of Standard Deviation	0.0118		
nu star	88290		
Approximate Chi Square Value (.05)	87600	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.72
Adjusted Chi Square Value	87495	95% Jackknife UCL	0.721
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.936	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.491	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.728
		97.5% Chebyshev(Mean, Sd) UCL	0.734
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.746
95% Approximate Gamma UCL	0.721		
95% Adjusted Gamma UCL	0.721		

Potential UCL to Use		Use 95% Student's-t UCL	0.721
		or 95% Modified-t UCL	0.721

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	35.68	Minimum of Log Data	3.575
Maximum	85	Maximum of Log Data	4.443
Mean	64.56	Mean of log Data	4.121
Median	61.54	SD of log Data	0.325
SD	19.71		
Coefficient of Variation	0.305		
Skewness	-0.0964		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	74.78	95% H-UCL	78.66
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	91.42
95% Adjusted-CLT UCL (Chen-1995)	73.75	97.5% Chebyshev (MVUE) UCL	103
95% Modified-t UCL (Johnson-1978)	74.75	99% Chebyshev (MVUE) UCL	125.7

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	8.253	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.823		
MLE of Mean	64.56		
MLE of Standard Deviation	22.47		
nu star	198.1		
Approximate Chi Square Value (.05)	166.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	73.92
Adjusted Chi Square Value	162.1	95% Jackknife UCL	74.78
		95% Standard Bootstrap UCL	73.63
Anderson-Darling Test Statistic	0.817	95% Bootstrap-t UCL	74.55
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	72.83
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	73.04
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	72.97
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	89.36
		97.5% Chebyshev(Mean, Sd) UCL	100.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	121.2
95% Approximate Gamma UCL	76.8		
95% Adjusted Gamma UCL	78.89		

Potential UCL to Use

Use 95% Student's-t UCL 74.78
or 95% Modified-t UCL 74.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	12361	Minimum of Log Data	9.422
Maximum	30000	Maximum of Log Data	10.31
Mean	18163	Mean of log Data	9.766
Median	17264	SD of log Data	0.295
SD	5552		
Coefficient of Variation	0.306		
Skewness	0.795		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	21042	95% H-UCL	21617
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	24951
95% Adjusted-CLT UCL (Chen-1995)	21193	97.5% Chebyshev (MVUE) UCL	27894
95% Modified-t UCL (Johnson-1978)	21103	99% Chebyshev (MVUE) UCL	33677

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.379	Data appear Normal at 5% Significance Level	
Theta Star	1937		
MLE of Mean	18163		
MLE of Standard Deviation	5931		
nu star	225.1		
Approximate Chi Square Value (.05)	191.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	20800
Adjusted Chi Square Value	186.6	95% Jackknife UCL	21042
		95% Standard Bootstrap UCL	20704
Anderson-Darling Test Statistic	0.44	95% Bootstrap-t UCL	21748
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	21548
Kolmogorov-Smirnov Test Statistic	0.164	95% Percentile Bootstrap UCL	20723
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	21054
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	25150
		97.5% Chebyshev(Mean, Sd) UCL	28173
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	34111
95% Approximate Gamma UCL	21365		
95% Adjusted Gamma UCL	21908		

Potential UCL to Use Use 95% Student's-t UCL 21042

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	93.28	Minimum of Log Data	4.536
Maximum	1337	Maximum of Log Data	7.198
Mean	581	Mean of log Data	6.147
Median	491.9	SD of log Data	0.742
SD	369.3		
Coefficient of Variation	0.636		
Skewness	0.761		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Test Statistic	0.935	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	772.4	95% H-UCL	1072
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1184
95% Adjusted-CLT UCL (Chen-1995)	781.4	97.5% Chebyshev (MVUE) UCL	1437
95% Modified-t UCL (Johnson-1978)	776.3	99% Chebyshev (MVUE) UCL	1934

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.896	Data appear Normal at 5% Significance Level	
Theta Star	306.4		
MLE of Mean	581		
MLE of Standard Deviation	421.9		
nu star	45.5		
Approximate Chi Square Value (.05)	31.03	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	756.3
Adjusted Chi Square Value	29.21	95% Jackknife UCL	772.4
		95% Standard Bootstrap UCL	744.1
Anderson-Darling Test Statistic	0.184	95% Bootstrap-t UCL	797.4
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	791.7
Kolmogorov-Smirnov Test Statistic	0.112	95% Percentile Bootstrap UCL	750.2
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	756.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1046
		97.5% Chebyshev(Mean, Sd) UCL	1247
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1642
95% Approximate Gamma UCL	852		
95% Adjusted Gamma UCL	905		

Potential UCL to Use Use 95% Student's-t UCL 772.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	14	Minimum of Log Data	2.639
Maximum	105.3	Maximum of Log Data	4.657
Mean	64.15	Mean of log Data	4.033
Median	65	SD of log Data	0.606
SD	26.87		
Coefficient of Variation	0.419		
Skewness	-0.457		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.846	Shapiro Wilk Test Statistic	0.729
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	78.08	95% H-UCL	102.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	119.2
95% Adjusted-CLT UCL (Chen-1995)	75.82	97.5% Chebyshev (MVUE) UCL	141.9
95% Modified-t UCL (Johnson-1978)	77.91	99% Chebyshev (MVUE) UCL	186.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.109	Data do not follow a Discernable Distribution (0.05)	
Theta Star	20.64		
MLE of Mean	64.15		
MLE of Standard Deviation	36.39		
nu star	74.61		
Approximate Chi Square Value (.05)	55.71	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	76.91
Adjusted Chi Square Value	53.23	95% Jackknife UCL	78.08
		95% Standard Bootstrap UCL	76.45
Anderson-Darling Test Statistic	1.391	95% Bootstrap-t UCL	76.75
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	77.26
Kolmogorov-Smirnov Test Statistic	0.372	95% Percentile Bootstrap UCL	75.79
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	75.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	97.96
		97.5% Chebyshev(Mean, Sd) UCL	112.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	141.3
95% Approximate Gamma UCL	85.91		
95% Adjusted Gamma UCL	89.92		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 97.96

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.2	Minimum of Log Data	-1.609
Maximum	0.37	Maximum of Log Data	-0.994
Mean	0.285	Mean of log Data	-1.263
Median	0.285	SD of log Data	0.132
SD	0.0362		
Coefficient of Variation	0.127		
Skewness	-8.20E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.588
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.304	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.306
95% Adjusted-CLT UCL (Chen-1995)	0.302	95% Chebyshev (MVUE) UCL	0.333
95% Modified-t UCL (Johnson-1978)	0.304	97.5% Chebyshev (MVUE) UCL	0.353
		99% Chebyshev (MVUE) UCL	0.394

Gamma Distribution Test

k star (bias corrected)	48.49	Data Distribution	
Theta Star	0.00588	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.285		
MLE of Standard Deviation	0.0409		
nu star	1164		
Approximate Chi Square Value (.05)	1085	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.302
Adjusted Chi Square Value	1074	95% Jackknife UCL	0.304

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.728	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.433	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.331
		97.5% Chebyshev(Mean, Sd) UCL	0.35
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.389
95% Approximate Gamma UCL	0.306		
95% Adjusted Gamma UCL	0.309		

Potential UCL to Use

Use 95% Student's-t UCL	0.304
or 95% Modified-t UCL	0.304

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	35.8	Minimum of Log Data	3.578
Maximum	41.1	Maximum of Log Data	3.716
Mean	38.45	Mean of log Data	3.649
Median	38.45	SD of log Data	0.0294
SD	1.13		
Coefficient of Variation	0.0294		
Skewness	1.13E-14		

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	39.04	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	38.99	95% Chebyshev (MVUE) UCL	39.87
95% Modified-t UCL (Johnson-1978)	39.04	97.5% Chebyshev (MVUE) UCL	40.49
		99% Chebyshev (MVUE) UCL	41.7

Gamma Distribution Test

k star (bias corrected)	945.3	Data Distribution	
Theta Star	0.0407	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	38.45		
MLE of Standard Deviation	1.251		
nu star	22687		
Approximate Chi Square Value (.05)	22338	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	38.99
Adjusted Chi Square Value	22285	95% Jackknife UCL	39.04
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.714	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.418	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.87
		97.5% Chebyshev(Mean, Sd) UCL	40.49
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	41.7
95% Approximate Gamma UCL	39.05		
95% Adjusted Gamma UCL	39.14		

Potential UCL to Use

Use 95% Student's-t UCL	39.04
or 95% Modified-t UCL	39.04

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-19.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	6	Minimum of Log Data	1.792
Maximum	12	Maximum of Log Data	2.485
Mean	9.01	Mean of log Data	2.178
Median	9.01	SD of log Data	0.213
SD	1.825		
Coefficient of Variation	0.203		
Skewness	-0.156		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Test Statistic	0.9
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.956	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.17
95% Adjusted-CLT UCL (Chen-1995)	9.851	95% Chebyshev (MVUE) UCL	11.44
95% Modified-t UCL (Johnson-1978)	9.952	97.5% Chebyshev (MVUE) UCL	12.49
		99% Chebyshev (MVUE) UCL	14.55

Gamma Distribution Test

k star (bias corrected)	18.93	Data Distribution	
Theta Star	0.476	Data appear Normal at 5% Significance Level	
MLE of Mean	9.01		
MLE of Standard Deviation	2.071		
nu star	454.4		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.029	406 Nonparametric Statistics	
Adjusted Chi Square Value	399	95% CLT UCL	9.877
		95% Jackknife UCL	9.956
		95% Standard Bootstrap UCL	9.843
Anderson-Darling Test Statistic	0.635	95% Bootstrap-t UCL	9.956
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	9.924
Kolmogorov-Smirnov Test Statistic	0.277	95% Percentile Bootstrap UCL	9.813
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	9.8
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.31
		97.5% Chebyshev(Mean, Sd) UCL	12.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.25
95% Approximate Gamma UCL	10.08		
95% Adjusted Gamma UCL	10.26		

Potential UCL to Use

		Use 95% Student's-t UCL	9.956
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	13.6	Minimum of Log Data	2.61
Maximum	85	Maximum of Log Data	4.443
Mean	48.78	Mean of log Data	3.801
Median	48.56	SD of log Data	0.465
SD	19.7		
Coefficient of Variation	0.404		
Skewness	0.669		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.814
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	58.99	95% H-UCL	66.95
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	78.9
95% Adjusted-CLT UCL (Chen-1995)	59.3	97.5% Chebyshev (MVUE) UCL	91.68
95% Modified-t UCL (Johnson-1978)	59.17	99% Chebyshev (MVUE) UCL	116.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.536	Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.75		
MLE of Mean	48.78		
MLE of Standard Deviation	22.9		
nu star	108.9		
Approximate Chi Square Value (.05)	85.79	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	58.13
Adjusted Chi Square Value	82.67	95% Jackknife UCL	58.99
		95% Standard Bootstrap UCL	57.83
Anderson-Darling Test Statistic	0.92	95% Bootstrap-t UCL	63.71
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	76.7
Kolmogorov-Smirnov Test Statistic	0.279	95% Percentile Bootstrap UCL	57.93
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	59.67
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	73.56
		97.5% Chebyshev(Mean, Sd) UCL	84.29
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	105.4
95% Approximate Gamma UCL	61.9		
95% Adjusted Gamma UCL	64.24		

Potential UCL to Use

Use 95% Student's-t UCL 58.99
or 95% Modified-t UCL 59.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	58.38	Minimum of Log Data	4.067
Maximum	78.79	Maximum of Log Data	4.367
Mean	65.9	Mean of log Data	4.186
Median	65	SD of log Data	0.0658
SD	4.548		
Coefficient of Variation	0.069		
Skewness	1.988		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.623	Shapiro Wilk Test Statistic	0.645
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.25	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	71.35
95% Adjusted-CLT UCL (Chen-1995)	68.86	97.5% Chebyshev (MVUE) UCL	73.72
95% Modified-t UCL (Johnson-1978)	68.38	99% Chebyshev (MVUE) UCL	78.36

Gamma Distribution Test

k star (bias corrected)	183.3	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.359		
MLE of Mean	65.9		
MLE of Standard Deviation	4.867		
nu star	4400		
Approximate Chi Square Value (.05)	4247	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	68.06
Adjusted Chi Square Value	4224	95% Jackknife UCL	68.25
		95% Standard Bootstrap UCL	67.99
Anderson-Darling Test Statistic	2.198	95% Bootstrap-t UCL	72.05
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	80.25
Kolmogorov-Smirnov Test Statistic	0.408	95% Percentile Bootstrap UCL	68.27
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	68.75
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	71.62
		97.5% Chebyshev(Mean, Sd) UCL	74.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	78.96
95% Approximate Gamma UCL	68.27		
95% Adjusted Gamma UCL	68.64		

Potential UCL to Use	Use 95% Student's-t UCL	68.25
	or 95% Modified-t UCL	68.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

Minimum	0.034	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.381
Mean	7.439	Maximum of Log Data	2.303
Median	8.44	Mean of log Data	1.265
SD	3.648	SD of log Data	2.137
Coefficient of Variation	0.49		
Skewness	-1.616		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.693	Shapiro Wilk Test Statistic	0.517
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1032
95% Adjusted-CLT UCL (Chen-1995)	8.646	95% Chebyshev (MVUE) UCL	86.92
95% Modified-t UCL (Johnson-1978)	9.249	97.5% Chebyshev (MVUE) UCL	114.9
		99% Chebyshev (MVUE) UCL	169.7

Gamma Distribution Test

k star (bias corrected)	0.656	Data Distribution	
Theta Star	11.34	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.439		
MLE of Standard Deviation	9.186		
nu star	15.74		
Approximate Chi Square Value (.05)	7.78	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9.171
Adjusted Chi Square Value	6.942	95% Jackknife UCL	9.33
		95% Standard Bootstrap UCL	9.116
Anderson-Darling Test Statistic	2.919	95% Bootstrap-t UCL	8.881
Anderson-Darling 5% Critical Value	0.764	95% Hall's Bootstrap UCL	8.7
Kolmogorov-Smirnov Test Statistic	0.48	95% Percentile Bootstrap UCL	9.053
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL	8.84
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.03
		97.5% Chebyshev(Mean, Sd) UCL	14.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.92
95% Approximate Gamma UCL	15.05		
95% Adjusted Gamma UCL	16.87		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 17.92

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-20.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

		Log-transformed Statistics	
Minimum	6.02	Minimum of Log Data	1.795
Maximum	16.4	Maximum of Log Data	2.797
Mean	9.765	Mean of log Data	2.23
Median	10.08	SD of log Data	0.327
SD	3.233		
Coefficient of Variation	0.331		
Skewness	0.621		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.44	95% H-UCL	11.89
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.82
95% Adjusted-CLT UCL (Chen-1995)	11.48	97.5% Chebyshev (MVUE) UCL	15.58
95% Modified-t UCL (Johnson-1978)	11.47	99% Chebyshev (MVUE) UCL	19.03

Gamma Distribution Test

k star (bias corrected)	7.786	Data Distribution	
Theta Star	1.254	Data appear Normal at 5% Significance Level	
MLE of Mean	9.765		
MLE of Standard Deviation	3.499		
nu star	186.9		
Approximate Chi Square Value (.05)	156.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.3
Adjusted Chi Square Value	152	95% Jackknife UCL	11.44
		95% Standard Bootstrap UCL	11.19
Anderson-Darling Test Statistic	0.55	95% Bootstrap-t UCL	11.72
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	11.56
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	11.29
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.35
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.83
		97.5% Chebyshev(Mean, Sd) UCL	15.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.05
95% Approximate Gamma UCL	11.68		
95% Adjusted Gamma UCL	12.01		

Potential UCL to Use

	Use 95% Student's-t UCL	11.44
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	93.5 Minimum of Log Data	4.538
Maximum	326 Maximum of Log Data	5.787
Mean	209.8 Mean of log Data	5.315
Median	209.8 SD of log Data	0.276
SD	49.57	
Coefficient of Variation	0.236	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.559
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	235.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	247.6
95% Adjusted-CLT UCL (Chen-1995)	233.3	95% Chebyshev (MVUE) UCL	284.3
95% Modified-t UCL (Johnson-1978)	235.4	97.5% Chebyshev (MVUE) UCL	316.1
		99% Chebyshev (MVUE) UCL	378.7

Gamma Distribution Test

k star (bias corrected)	12.44	Data Distribution	
Theta Star	16.86	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	209.8		
MLE of Standard Deviation	59.47		
nu star	298.6		
Approximate Chi Square Value (.05)	259.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	233.3
Adjusted Chi Square Value	254	95% Jackknife UCL	235.4
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.771	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	272.1
		97.5% Chebyshev(Mean, Sd) UCL	299.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	352.1
95% Approximate Gamma UCL	241.3		
95% Adjusted Gamma UCL	246.6		

Potential UCL to Use Use 95% Student's-t UCL 235.4
 or 95% Modified-t UCL 235.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.5 Minimum of Log Data	-0.693
Maximum	1.1 Maximum of Log Data	0.0953
Mean	0.8 Mean of log Data	-0.236
Median	0.8 SD of log Data	0.171
SD	0.128	
Coefficient of Variation	0.16	
Skewness	-3.07E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.582
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.866	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.88
95% Adjusted-CLT UCL (Chen-1995)	0.861	95% Chebyshev (MVUE) UCL	0.973
95% Modified-t UCL (Johnson-1978)	0.866	97.5% Chebyshev (MVUE) UCL	1.048
		99% Chebyshev (MVUE) UCL	1.194

Gamma Distribution Test

k star (bias corrected)	29.87	Data Distribution	
Theta Star	0.0268	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.8		
MLE of Standard Deviation	0.146		
nu star	717		
Approximate Chi Square Value (.05)	655.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.861
Adjusted Chi Square Value	646.9	95% Jackknife UCL	0.866
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.737	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.438	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.961
		97.5% Chebyshev(Mean, Sd) UCL	1.031
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.167
95% Approximate Gamma UCL	0.875		
95% Adjusted Gamma UCL	0.887		

Potential UCL to Use Use 95% Student's-t UCL 0.866
 or 95% Modified-t UCL 0.866

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

Minimum	11.3	Log-transformed Statistics	
Maximum	103	Minimum of Log Data	2.425
Mean	57.21	Maximum of Log Data	4.635
Median	50.29	Mean of log Data	3.915
SD	26.77	SD of log Data	0.593
Coefficient of Variation	0.468		
Skewness	0.212		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Test Statistic	0.873
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.09	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	89.66
95% Adjusted-CLT UCL (Chen-1995)	70.43	95% Chebyshev (MVUE) UCL	104.2
95% Modified-t UCL (Johnson-1978)	71.17	97.5% Chebyshev (MVUE) UCL	123.8
		99% Chebyshev (MVUE) UCL	162.3

Gamma Distribution Test

k star (bias corrected)	3.031	Data Distribution	
Theta Star	18.87	Data appear Normal at 5% Significance Level	
MLE of Mean	57.21		
MLE of Standard Deviation	32.86		
nu star	72.75		
Approximate Chi Square Value (.05)	54.11	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	69.92
Adjusted Chi Square Value	51.66	95% Jackknife UCL	71.09
		95% Standard Bootstrap UCL	69.17
Anderson-Darling Test Statistic	0.437	95% Bootstrap-t UCL	73.13
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	70.14
Kolmogorov-Smirnov Test Statistic	0.176	95% Percentile Bootstrap UCL	69.73
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	69.68
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	90.89
		97.5% Chebyshev(Mean, Sd) UCL	105.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	134.1
95% Approximate Gamma UCL	76.92		
95% Adjusted Gamma UCL	80.56		

Potential UCL to Use Use 95% Student's-t UCL 71.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	5 Minimum of Log Data	1.609
Maximum	21.1 Maximum of Log Data	3.049
Mean	13.05 Mean of log Data	2.529
Median	13.05 SD of log Data	0.321
SD	3.433	
Coefficient of Variation	0.263	
Skewness	-1.84E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.549
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	14.83	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.94
95% Adjusted-CLT UCL (Chen-1995)	14.68	95% Chebyshev (MVUE) UCL	18.5
95% Modified-t UCL (Johnson-1978)	14.83	97.5% Chebyshev (MVUE) UCL	20.82
		99% Chebyshev (MVUE) UCL	25.38

Gamma Distribution Test

k star (bias corrected)	9.576	Data Distribution	
Theta Star	1.363	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	13.05		
MLE of Standard Deviation	4.217		
nu star	229.8		
Approximate Chi Square Value (.05)	195.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	14.68
Adjusted Chi Square Value	190.9	95% Jackknife UCL	14.83
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.788	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.454	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17.37
		97.5% Chebyshev(Mean, Sd) UCL	19.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	22.91
95% Approximate Gamma UCL	15.32		
95% Adjusted Gamma UCL	15.71		

Potential UCL to Use Use 95% Student's-t UCL 14.83
 or 95% Modified-t UCL 14.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	301.9	Minimum of Log Data	5.71
Maximum	4670	Maximum of Log Data	8.449
Mean	784.6	Mean of log Data	6.243
Median	435.6	SD of log Data	0.73
SD	1227		
Coefficient of Variation	1.564		
Skewness	3.428		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.397	Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1421	95% H-UCL	1153
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1281
95% Adjusted-CLT UCL (Chen-1995)	1742	97.5% Chebyshev (MVUE) UCL	1552
95% Modified-t UCL (Johnson-1978)	1479	99% Chebyshev (MVUE) UCL	2085

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.05	Data do not follow a Discernable Distribution (0.05)	
Theta Star	747		
MLE of Mean	784.6		
MLE of Standard Deviation	765.6		
nu star	25.21		
Approximate Chi Square Value (.05)	14.77	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1367
Adjusted Chi Square Value	13.57	95% Jackknife UCL	1421
		95% Standard Bootstrap UCL	1344
Anderson-Darling Test Statistic	2.514	95% Bootstrap-t UCL	6318
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	4832
Kolmogorov-Smirnov Test Statistic	0.446	95% Percentile Bootstrap UCL	1489
Kolmogorov-Smirnov 5% Critical Value	0.251	95% BCA Bootstrap UCL	1852
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2329
		97.5% Chebyshev(Mean, Sd) UCL	2997
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4309
95% Approximate Gamma UCL	1339		
95% Adjusted Gamma UCL	1458		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2329

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0187	Minimum of Log Data	-3.979
Maximum		10 Maximum of Log Data	2.303
Mean	8.111	Mean of log Data	1.268
Median		10 SD of log Data	2.346
SD	3.856		
Coefficient of Variation	0.475		
Skewness	-1.897		

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 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.542	Shapiro Wilk Test Statistic	0.49
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.11	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3191
95% Adjusted-CLT UCL (Chen-1995)	9.29	95% Chebyshev (MVUE) UCL	128.6
95% Modified-t UCL (Johnson-1978)	10.01	97.5% Chebyshev (MVUE) UCL	170.7
		99% Chebyshev (MVUE) UCL	253.4

Gamma Distribution Test

k star (bias corrected)	0.602	Data Distribution	
Theta Star	13.48	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.111		
MLE of Standard Deviation	10.46		
nu star	14.44		
Approximate Chi Square Value (.05)	6.876	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9.942
Adjusted Chi Square Value	6.096	95% Jackknife UCL	10.11
		95% Standard Bootstrap UCL	9.752
Anderson-Darling Test Statistic	3.482	95% Bootstrap-t UCL	9.445
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	9.435
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	9.547
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	9.168
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.96
		97.5% Chebyshev(Mean, Sd) UCL	15.06
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.19
95% Approximate Gamma UCL	17.04		
95% Adjusted Gamma UCL	19.22		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 19.19
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	8.3 Minimum of Log Data	2.116
Maximum	65.7 Maximum of Log Data	4.185
Mean	56.23 Mean of log Data	3.886
Median	65 SD of log Data	0.69
SD	20.7	
Coefficient of Variation	0.368	
Skewness	-2.082	

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.484 Shapiro Wilk Test Statistic	0.491
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.97	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	101.8
95% Adjusted-CLT UCL (Chen-1995)	62.22	95% Chebyshev (MVUE) UCL	115
95% Modified-t UCL (Johnson-1978)	66.37	97.5% Chebyshev (MVUE) UCL	138.6
		99% Chebyshev (MVUE) UCL	185

Gamma Distribution Test

k star (bias corrected)	2.786	Data Distribution	
Theta Star	20.19	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	56.23		
MLE of Standard Deviation	33.69		
nu star	66.85		
Approximate Chi Square Value (.05)	49.04	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	66.06
Adjusted Chi Square Value	46.72	95% Jackknife UCL	66.97
		95% Standard Bootstrap UCL	65.05

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.296	95% Bootstrap-t UCL	63.69
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	62.48
Kolmogorov-Smirnov Test Statistic	0.509	95% Percentile Bootstrap UCL	65.06
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	61.02
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	82.28
		97.5% Chebyshev(Mean, Sd) UCL	93.55
		99% Chebyshev(Mean, Sd) UCL	115.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	76.66
95% Adjusted Gamma UCL	80.48

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 82.28

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	10 Minimum of Log Data	2.303
Maximum	12.22 Maximum of Log Data	2.503
Mean	10.38 Mean of log Data	2.338
Median	10 SD of log Data	0.0677
SD	0.739	
Coefficient of Variation	0.0712	
Skewness	1.855	

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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.602
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.76	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	10.85	95% Chebyshev (MVUE) UCL	11.26
95% Modified-t UCL (Johnson-1978)	10.78	97.5% Chebyshev (MVUE) UCL	11.65
		99% Chebyshev (MVUE) UCL	12.4

Gamma Distribution Test

k star (bias corrected)	172.9	Data Distribution	
Theta Star	0.06	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.38		
MLE of Standard Deviation	0.789		
nu star	4150		
Approximate Chi Square Value (.05)	4001	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.73
Adjusted Chi Square Value	3979	95% Jackknife UCL	10.76
		95% Standard Bootstrap UCL	10.7
Anderson-Darling Test Statistic	2.433	95% Bootstrap-t UCL	11.13
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10.65
Kolmogorov-Smirnov Test Statistic	0.456	95% Percentile Bootstrap UCL	10.75
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.79
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.31
		97.5% Chebyshev(Mean, Sd) UCL	11.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.5
95% Approximate Gamma UCL	10.77		
95% Adjusted Gamma UCL	10.83		

Potential UCL to Use Use 95% Student's-t UCL 10.76
 or 95% Modified-t UCL 10.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.0048	Minimum of Log Data	-5.339
Maximum	0.031	Maximum of Log Data	-3.474
Mean	0.0179	Mean of log Data	-4.087
Median	0.0179	SD of log Data	0.425
SD	0.00559		
Coefficient of Variation	0.312		
Skewness	0		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.525
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0208	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0239
95% Adjusted-CLT UCL (Chen-1995)	0.0206	95% Chebyshev (MVUE) UCL	0.0281
95% Modified-t UCL (Johnson-1978)	0.0208	97.5% Chebyshev (MVUE) UCL	0.0324
		99% Chebyshev (MVUE) UCL	0.0409

Gamma Distribution Test

k star (bias corrected)	6.045	Data Distribution	
Theta Star	0.00296	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0179		
MLE of Standard Deviation	0.00728		
nu star	145.1		
Approximate Chi Square Value (.05)	118.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.0206
Adjusted Chi Square Value	114.5	95% Jackknife UCL	0.0208
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.834	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.464	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0249
		97.5% Chebyshev(Mean, Sd) UCL	0.028
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0339
95% Approximate Gamma UCL	0.022		
95% Adjusted Gamma UCL	0.0227		

Potential UCL to Use	Use 95% Student's-t UCL	0.0208
	or 95% Modified-t UCL	0.0208

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics		Log-transformed Statistics	
Minimum	24.7	Minimum of Log Data	3.207
Maximum	38.1	Maximum of Log Data	3.64
Mean	31.4	Mean of log Data	3.443
Median	31.4	SD of log Data	0.0928
SD	2.857		
Coefficient of Variation	0.091		
Skewness	6.92E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.594
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	32.88	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35.07
95% Adjusted-CLT UCL (Chen-1995)	32.76	97.5% Chebyshev (MVUE) UCL	36.66
95% Modified-t UCL (Johnson-1978)	32.88	99% Chebyshev (MVUE) UCL	39.78

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	96.75	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.325		
MLE of Mean	31.4		
MLE of Standard Deviation	3.192		
nu star	2322		
Approximate Chi Square Value (.05)	2211	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	32.76
Adjusted Chi Square Value	2195	95% Jackknife UCL	32.88
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.721	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.428	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	34.99
		97.5% Chebyshev(Mean, Sd) UCL	36.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	39.61
95% Approximate Gamma UCL	32.98		
95% Adjusted Gamma UCL	33.22		

Potential UCL to Use	Use 95% Student's-t UCL	32.88
	or 95% Modified-t UCL	32.88

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-22.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	8480	Minimum of Log Data	9.045
Maximum	13300	Maximum of Log Data	9.496
Mean	10760	Mean of log Data	9.279
Median	10760	SD of log Data	0.0963
SD	1032		
Coefficient of Variation	0.0959		
Skewness	0.448		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.634	Shapiro Wilk Test Statistic	0.635
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	11295	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12065
95% Adjusted-CLT UCL (Chen-1995)	11291	97.5% Chebyshev (MVUE) UCL	12630
95% Modified-t UCL (Johnson-1978)	11301	99% Chebyshev (MVUE) UCL	13739

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	89.01	Data do not follow a Discernable Distribution (0.05)	
Theta Star	120.9		
MLE of Mean	10760		
MLE of Standard Deviation	1140		
nu star	2136		
Approximate Chi Square Value (.05)	2030	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11250
Adjusted Chi Square Value	2014	95% Jackknife UCL	11295
		95% Standard Bootstrap UCL	11238
Anderson-Darling Test Statistic	2.434	95% Bootstrap-t UCL	11261
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11565
Kolmogorov-Smirnov Test Statistic	0.404	95% Percentile Bootstrap UCL	11183
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11205
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12059
		97.5% Chebyshev(Mean, Sd) UCL	12621
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13724
95% Approximate Gamma UCL	11324		
95% Adjusted Gamma UCL	11413		
Potential UCL to Use		Use 95% Student's-t UCL	11295
		or 95% Modified-t UCL	11301

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.38	Minimum of Log Data	-0.968
Maximum	0.66	Maximum of Log Data	-0.416
Mean	0.497	Mean of log Data	-0.707
Median	0.497	SD of log Data	0.121
SD	0.0621		
Coefficient of Variation	0.125		
Skewness	1.213		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.671	Shapiro Wilk Test Statistic	0.694
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.529	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.53
95% Adjusted-CLT UCL (Chen-1995)	0.533	95% Chebyshev (MVUE) UCL	0.572
95% Modified-t UCL (Johnson-1978)	0.53	97.5% Chebyshev (MVUE) UCL	0.605
		99% Chebyshev (MVUE) UCL	0.67

Gamma Distribution Test

k star (bias corrected)	54.99	Data Distribution	
Theta Star	0.009	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.497		
MLE of Standard Deviation	0.067		
nu star	1320		
Approximate Chi Square Value (.05)	1236	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.526
Adjusted Chi Square Value	1224	95% Jackknife UCL	0.529
		95% Standard Bootstrap UCL	0.525
Anderson-Darling Test Statistic	2.077	95% Bootstrap-t UCL	0.531
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	0.577
Kolmogorov-Smirnov Test Statistic	0.401	95% Percentile Bootstrap UCL	0.526
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	0.53
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.575
		97.5% Chebyshev(Mean, Sd) UCL	0.609
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.675
95% Approximate Gamma UCL	0.53		
95% Adjusted Gamma UCL	0.535		

Potential UCL to Use	Use 95% Student's-t UCL	0.529
	or 95% Modified-t UCL	0.53

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	8.84 Minimum of Log Data	2.179
Maximum	13.73 Maximum of Log Data	2.62
Mean	10.91 Mean of log Data	2.385
Median	10.91 SD of log Data	0.102
SD	1.141	
Coefficient of Variation	0.105	
Skewness	0.953	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.868 Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	11.5 95% H-UCL	11.53
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12.31
95% Adjusted-CLT UCL (Chen-1995)	11.55 97.5% Chebyshev (MVUE) UCL	12.92
95% Modified-t UCL (Johnson-1978)	11.52 99% Chebyshev (MVUE) UCL	14.11

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	77.51 Data appear Normal at 5% Significance Level	
Theta Star	0.141	
MLE of Mean	10.91	
MLE of Standard Deviation	1.239	
nu star	1860	
Approximate Chi Square Value (.05)	1761 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	11.45
Adjusted Chi Square Value	1746 95% Jackknife UCL	11.5
	95% Standard Bootstrap UCL	11.43
Anderson-Darling Test Statistic	0.744 95% Bootstrap-t UCL	11.6
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	12.18
Kolmogorov-Smirnov Test Statistic	0.215 95% Percentile Bootstrap UCL	11.44
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	11.51
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.34
	97.5% Chebyshev(Mean, Sd) UCL	12.97
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	14.19
95% Approximate Gamma UCL	11.52	
95% Adjusted Gamma UCL	11.62	

Potential UCL to Use Use 95% Student's-t UCL 11.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics
Minimum	-0.039 Log Statistics Not Available
Maximum	0.288
Mean	0.0625
Median	0.0625
SD	0.0791
Coefficient of Variation	1.265
Skewness	2.191

Relevant UCL Statistics

	Lognormal Distribution Test
Normal Distribution Test	0.667 Not Available
Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution
95% Student's-t UCL	0.104 95% H-UCL N/A
Assuming Normal Distribution	95% UCLs (Adjusted for Skewness)
95% Student's-t UCL	0.104 95% Adjusted-CLT UCL (Chen 1995) 0.116
	95% Modified-t UCL (Johnson-1978) 0.106

Gamma Distribution Test

	Data Distribution
Gamma Statistics Not Available	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.162	95% CLT UCL	0.1
		95% Jackknife UCL	0.104
		95% Standard Bootstrap UCL	0.098
		95% Bootstrap-t UCL	0.124
		95% Hall's Bootstrap UCL	0.283
		95% Percentile Bootstrap UCL	0.1
		95% BCA Bootstrap UCL	0.117
		95% Chebyshev(Mean, Sd) UCL	0.162
		97.5% Chebyshev(Mean, Sd) UCL	0.205
		99% Chebyshev(Mean, Sd) UCL	0.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	35.51	Minimum of Log Data	3.57
Maximum	55.27	Maximum of Log Data	4.012
Mean	44.79	Mean of log Data	3.795
Median	44.79	SD of log Data	0.118
SD	5.31		
Coefficient of Variation	0.119		
Skewness	0.365		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	47.54	95% H-UCL	47.76
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	51.46
95% Adjusted-CLT UCL (Chen-1995)	47.48	97.5% Chebyshev (MVUE) UCL	54.34
95% Modified-t UCL (Johnson-1978)	47.57	99% Chebyshev (MVUE) UCL	60.01

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	58.74	Data appear Normal at 5% Significance Level	
Theta Star	0.763		
MLE of Mean	44.79		
MLE of Standard Deviation	5.844		
nu star	1410		
Approximate Chi Square Value (.05)	1323	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	47.31
Adjusted Chi Square Value	1311	95% Jackknife UCL	47.54
		95% Standard Bootstrap UCL	47.19
Anderson-Darling Test Statistic	0.396	95% Bootstrap-t UCL	48.08
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	48.23
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL	47.22
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	47.35
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	51.47
		97.5% Chebyshev(Mean, Sd) UCL	54.36
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	60.04
95% Approximate Gamma UCL	47.7		
95% Adjusted Gamma UCL	48.17		

Potential UCL to Use Use 95% Student's-t UCL 47.54

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	4.9	Minimum of Log Data	1.589
Maximum	13.9	Maximum of Log Data	2.632
Mean	9.767	Mean of log Data	2.257
Median	9.767	SD of log Data	0.233
SD	1.938		
Coefficient of Variation	0.198		
Skewness	-0.663		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.647	Shapiro Wilk Test Statistic	0.59
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.77	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.2
95% Adjusted-CLT UCL (Chen-1995)	10.57	95% Chebyshev (MVUE) UCL	12.69
95% Modified-t UCL (Johnson-1978)	10.75	97.5% Chebyshev (MVUE) UCL	13.94
		99% Chebyshev (MVUE) UCL	16.4

Gamma Distribution Test

k star (bias corrected)	17.2	Data Distribution	
Theta Star	0.568	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.767		
MLE of Standard Deviation	2.355		
nu star	412.7		
Approximate Chi Square Value (.05)	366.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.69
Adjusted Chi Square Value	360	95% Jackknife UCL	10.77
		95% Standard Bootstrap UCL	10.69
Anderson-Darling Test Statistic	2.453	95% Bootstrap-t UCL	10.6
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	10.78
Kolmogorov-Smirnov Test Statistic	0.444	95% Percentile Bootstrap UCL	10.58
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.52
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.21
		97.5% Chebyshev(Mean, Sd) UCL	13.26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.33
95% Approximate Gamma UCL	10.99		
95% Adjusted Gamma UCL	11.2		

Potential UCL to Use	Use 95% Student's-t UCL	10.77
	or 95% Modified-t UCL	10.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	162.1 Minimum of Log Data	5.088
Maximum	1700 Maximum of Log Data	7.438
Mean	758 Mean of log Data	6.464
Median	752.3 SD of log Data	0.635
SD	445.1	
Coefficient of Variation	0.587	
Skewness	1.127	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.851 Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	988.8 95% H-UCL	1225
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1408
95% Adjusted-CLT UCL (Chen-1995)	1014 97.5% Chebyshev (MVUE) UCL	1684
95% Modified-t UCL (Johnson-1978)	995.7 99% Chebyshev (MVUE) UCL	2226

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.425 Data Follow Appr. Gamma Distribution at 5% Significance Lev	
Theta Star	312.5	
MLE of Mean	758	
MLE of Standard Deviation	486.7	
nu star	58.21	
Approximate Chi Square Value (.05)	41.67 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	969.4
Adjusted Chi Square Value	39.54 95% Jackknife UCL	988.8
	95% Standard Bootstrap UCL	961.9
Anderson-Darling Test Statistic	0.582 95% Bootstrap-t UCL	1127
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	2601
Kolmogorov-Smirnov Test Statistic	0.258 95% Percentile Bootstrap UCL	968.4
Kolmogorov-Smirnov 5% Critical Value	0.247 95% BCA Bootstrap UCL	993
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1318
	97.5% Chebyshev(Mean, Sd) UCL	1560
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2036
95% Approximate Gamma UCL	1059	
95% Adjusted Gamma UCL	1116	

Potential UCL to Use Use 95% Approximate Gamma UCL 1059

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	8.9 Minimum of Log Data	2.186
Maximum	70.76 Maximum of Log Data	4.259
Mean	46.65 Mean of log Data	3.677
Median	46.65 SD of log Data	0.69
SD	21.65	
Coefficient of Variation	0.464	
Skewness	-0.75	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.848 Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	57.87 95% H-UCL	82.61
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	93.27
95% Adjusted-CLT UCL (Chen-1995)	55.48 97.5% Chebyshev (MVUE) UCL	112.4
95% Modified-t UCL (Johnson-1978)	57.64 99% Chebyshev (MVUE) UCL	150.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.437 Data do not follow a Discernable Distribution (0.05)	
Theta Star	19.14	
MLE of Mean	46.65	
MLE of Standard Deviation	29.88	
nu star	58.48	
Approximate Chi Square Value (.05)	41.9 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	56.93
Adjusted Chi Square Value	39.76 95% Jackknife UCL	57.87
	95% Standard Bootstrap UCL	56.53
Anderson-Darling Test Statistic	1.139 95% Bootstrap-t UCL	56.93
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	54.82
Kolmogorov-Smirnov Test Statistic	0.325 95% Percentile Bootstrap UCL	55.82
Kolmogorov-Smirnov 5% Critical Value	0.247 95% BCA Bootstrap UCL	55.57
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	73.89
	97.5% Chebyshev(Mean, Sd) UCL	85.68
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	108.8
95% Approximate Gamma UCL	65.1	
95% Adjusted Gamma UCL	68.6	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 73.89
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

	Log-transformed Statistics	
Minimum	0.35	Minimum of Log Data -1.05
Maximum	18	Maximum of Log Data 2.89
Mean	4.385	Mean of log Data 0.812
Median	4.385	SD of log Data 1.394
SD	4.781	
Coefficient of Variation	1.09	
Skewness	2.261	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.68	Shapiro Wilk Test Statistic 0.771
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	6.864	95% H-UCL 27.96
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 15.2
95% Adjusted-CLT UCL (Chen-1995)	7.618	97.5% Chebyshev (MVUE) UCL 19.52
95% Modified-t UCL (Johnson-1978)	7.014	99% Chebyshev (MVUE) UCL 28.01

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.716	Data do not follow a Discernable Distribution (0.05)
Theta Star	6.126	
MLE of Mean	4.385	
MLE of Standard Deviation	5.183	
nu star	17.18	
Approximate Chi Square Value (.05)	8.8	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 6.656
Adjusted Chi Square Value	7.901	95% Jackknife UCL 6.864
		95% Standard Bootstrap UCL 6.495

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.23	95% Bootstrap-t UCL 8.499
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL 16.86
Kolmogorov-Smirnov Test Statistic	0.307	95% Percentile Bootstrap UCL 6.939
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL 7.477
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 10.4
		97.5% Chebyshev(Mean, Sd) UCL 13
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 18.12
95% Approximate Gamma UCL	8.56	
95% Adjusted Gamma UCL	9.535	

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	10.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.028 Minimum of Log Data	-3.576
Maximum	11.35 Maximum of Log Data	2.429
Mean	6.437 Mean of log Data	0.808
Median	6.437 SD of log Data	2.398
SD	4.235	
Coefficient of Variation	0.658	
Skewness	-0.693	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.822 Shapiro Wilk Test Statistic	0.647
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	8.633 95% H-UCL	2708
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	89.53
95% Adjusted-CLT UCL (Chen-1995)	8.187 97.5% Chebyshev (MVUE) UCL	119
95% Modified-t UCL (Johnson-1978)	8.592 99% Chebyshev (MVUE) UCL	176.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.496 Data do not follow a Discernable Distribution (0.05)	
Theta Star	12.97	
MLE of Mean	6.437	
MLE of Standard Deviation	9.136	
nu star	11.92	
Approximate Chi Square Value (.05)	5.171 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	8.448
Adjusted Chi Square Value	4.512 95% Jackknife UCL	8.633
	95% Standard Bootstrap UCL	8.372
Anderson-Darling Test Statistic	2.046 95% Bootstrap-t UCL	8.229
Anderson-Darling 5% Critical Value	0.778 95% Hall's Bootstrap UCL	8.181
Kolmogorov-Smirnov Test Statistic	0.42 95% Percentile Bootstrap UCL	8.38
Kolmogorov-Smirnov 5% Critical Value	0.257 95% BCA Bootstrap UCL	8.099
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11.77
	97.5% Chebyshev(Mean, Sd) UCL	14.07
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.6
95% Approximate Gamma UCL	14.83	
95% Adjusted Gamma UCL	17	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.6
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-23.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.82	Minimum of Log Data	1.761
Maximum	18.03	Maximum of Log Data	2.892
Mean	9.494	Mean of log Data	2.207
Median	8.96	SD of log Data	0.298
SD	3.186		
Coefficient of Variation	0.336		
Skewness	1.799		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.836	Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.15	95% H-UCL	11.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.05
95% Adjusted-CLT UCL (Chen-1995)	11.52	97.5% Chebyshev (MVUE) UCL	14.6
95% Modified-t UCL (Johnson-1978)	11.22	99% Chebyshev (MVUE) UCL	17.64

Gamma Distribution Test

k star (bias corrected)	8.81	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.078		
MLE of Mean	9.494		
MLE of Standard Deviation	3.198		
nu star	211.4		
Approximate Chi Square Value (.05)	178.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.01
Adjusted Chi Square Value	174.2	95% Jackknife UCL	11.15
		95% Standard Bootstrap UCL	10.96

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.386	95% Bootstrap-t UCL	11.95
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	18.61
Kolmogorov-Smirnov Test Statistic	0.187	95% Percentile Bootstrap UCL	11.05
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.56
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.5
		97.5% Chebyshev(Mean, Sd) UCL	15.24
		99% Chebyshev(Mean, Sd) UCL	18.64

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.23		
95% Adjusted Gamma UCL	11.52		
Potential UCL to Use		Use 95% Approximate Gamma UCL	11.23

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.053	Minimum of Log Data	-2.937
Maximum	8.55	Maximum of Log Data	2.146
Mean	4.302	Mean of log Data	1.15
Median	4.302	SD of log Data	1.302
SD	1.812		
Coefficient of Variation	0.421		
Skewness	-2.61E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.415
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.241	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	29.05
95% Adjusted-CLT UCL (Chen-1995)	5.162	95% Chebyshev (MVUE) UCL	18.36
95% Modified-t UCL (Johnson-1978)	5.241	97.5% Chebyshev (MVUE) UCL	23.45
		99% Chebyshev (MVUE) UCL	33.46

Gamma Distribution Test

k star (bias corrected)	1.38	Data Distribution	
Theta Star	3.117	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.302		
MLE of Standard Deviation	3.662		
nu star	33.12		
Approximate Chi Square Value (.05)	20.96	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.162
Adjusted Chi Square Value	19.5	95% Jackknife UCL	5.241
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.274	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.517	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.581
		97.5% Chebyshev(Mean, Sd) UCL	7.567
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.505
95% Approximate Gamma UCL	6.796		
95% Adjusted Gamma UCL	7.307		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 6.581

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cesium-137 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	35.05	Minimum of Log Data	3.557
Maximum		85 Maximum of Log Data	4.443
Mean	51.14	Mean of log Data	3.898
Median	45.75	SD of log Data	0.274
SD	15.12		
Coefficient of Variation	0.296		
Skewness	1.135		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	58.98	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	59.94
95% Adjusted-CLT UCL (Chen-1995)	59.85	95% Chebyshev (MVUE) UCL	68.79
95% Modified-t UCL (Johnson-1978)	59.21	97.5% Chebyshev (MVUE) UCL	76.47
		99% Chebyshev (MVUE) UCL	91.56

Gamma Distribution Test

k star (bias corrected)	10.56	Data Distribution	
Theta Star	4.844	Data appear Normal at 5% Significance Level	
MLE of Mean	51.14		
MLE of Standard Deviation	15.74		
nu star	253.3		
Approximate Chi Square Value (.05)	217.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	58.32
Adjusted Chi Square Value	212.4	95% Jackknife UCL	58.98
		95% Standard Bootstrap UCL	57.97
Anderson-Darling Test Statistic	0.398	95% Bootstrap-t UCL	61.86
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	59.88
Kolmogorov-Smirnov Test Statistic	0.172	95% Percentile Bootstrap UCL	58.31
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	59.76
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	70.17
		97.5% Chebyshev(Mean, Sd) UCL	78.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	94.58
95% Approximate Gamma UCL	59.57		
95% Adjusted Gamma UCL	60.99		

Potential UCL to Use		Use 95% Student's-t UCL	58.98
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	12358	Minimum of Log Data	9.422
Maximum	33875	Maximum of Log Data	10.43
Mean	16380	Mean of log Data	9.665
Median	15079	SD of log Data	0.267
SD	5762		
Coefficient of Variation	0.352		
Skewness	2.941		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.604	Shapiro Wilk Test Statistic	0.733
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19367	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	19022
95% Adjusted-CLT UCL (Chen-1995)	20625	95% Chebyshev (MVUE) UCL	21789
95% Modified-t UCL (Johnson-1978)	19602	97.5% Chebyshev (MVUE) UCL	24175
		99% Chebyshev (MVUE) UCL	28862

Gamma Distribution Test

k star (bias corrected)	9.761	Data Distribution	
Theta Star	1678	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	16380		
MLE of Standard Deviation	5243		
nu star	234.3		
Approximate Chi Square Value (.05)	199.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	19116
Adjusted Chi Square Value	195	95% Jackknife UCL	19367
		95% Standard Bootstrap UCL	19069
Anderson-Darling Test Statistic	1.335	95% Bootstrap-t UCL	23798
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	29898
Kolmogorov-Smirnov Test Statistic	0.333	95% Percentile Bootstrap UCL	19411
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	21309
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23630
		97.5% Chebyshev(Mean, Sd) UCL	26767
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32930
95% Approximate Gamma UCL	19202		
95% Adjusted Gamma UCL	19680		

Potential UCL to Use

Use 95% Student's-t UCL 19367
or 95% Modified-t UCL 19602

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	287.7	Minimum of Log Data	5.662
Maximum	1302	Maximum of Log Data	7.171
Mean	552.6	Mean of log Data	6.204
Median	425.9	SD of log Data	0.471
SD	297.8		
Coefficient of Variation	0.539		
Skewness	1.582		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	707	95% H-UCL	746.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	879.4
95% Adjusted-CLT UCL (Chen-1995)	736	97.5% Chebyshev (MVUE) UCL	1023
95% Modified-t UCL (Johnson-1978)	713.5	99% Chebyshev (MVUE) UCL	1305

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.577	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	154.5		
MLE of Mean	552.6		
MLE of Standard Deviation	292.2		
nu star	85.85		
Approximate Chi Square Value (.05)	65.49	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	694
Adjusted Chi Square Value	62.78	95% Jackknife UCL	707
		95% Standard Bootstrap UCL	686.1
Anderson-Darling Test Statistic	0.57	95% Bootstrap-t UCL	776.6
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	783
Kolmogorov-Smirnov Test Statistic	0.199	95% Percentile Bootstrap UCL	693
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	733.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	927.3
		97.5% Chebyshev(Mean, Sd) UCL	1089
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1408
95% Approximate Gamma UCL	724.4		
95% Adjusted Gamma UCL	755.7		

Potential UCL to Use Use 95% Approximate Gamma UCL 724.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0236	Minimum of Log Data	-3.747
Maximum		10 Maximum of Log Data	2.303
Mean	8.889	Mean of log Data	1.767
Median		10 SD of log Data	1.738
SD	2.876		
Coefficient of Variation	0.324		
Skewness	-3.144		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.46	Shapiro Wilk Test Statistic	0.353
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL 10.38
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 9.449
 95% Modified-t UCL (Johnson-1978) 10.25

Assuming Lognormal Distribution

95% H-UCL 265.7
 95% Chebyshev (MVUE) UCL 70.41
 97.5% Chebyshev (MVUE) UCL 91.9
 99% Chebyshev (MVUE) UCL 134.1

Gamma Distribution Test

k star (bias corrected) 1.061
 Theta Star 8.379
 MLE of Mean 8.889
 MLE of Standard Deviation 8.63
 nu star 25.46

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.029
 Adjusted Chi Square Value 13.75

Nonparametric Statistics

95% CLT UCL 10.25
 95% Jackknife UCL 10.38
 95% Standard Bootstrap UCL 10.18

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 0.749
 Kolmogorov-Smirnov Test Statistic 0.472
 Kolmogorov-Smirnov 5% Critical Value 0.25

95% Bootstrap-t UCL 9.904
 95% Hall's Bootstrap UCL 9.768
 95% Percentile Bootstrap UCL 9.815
 95% BCA Bootstrap UCL 9.72

Data not Gamma Distributed at 5% Significance Level

95% Chebyshev(Mean, Sd) UCL 12.51
 97.5% Chebyshev(Mean, Sd) UCL 14.07
 99% Chebyshev(Mean, Sd) UCL 17.15

Assuming Gamma Distribution

95% Approximate Gamma UCL 15.12
 95% Adjusted Gamma UCL 16.46

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 17.15

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

Minimum	54.15	Log-transformed Statistics	
Maximum	88.92	Minimum of Log Data	3.992
Mean	68.14	Maximum of Log Data	4.488
Median		Mean of log Data	4.212
SD	10.04	65 SD of log Data	0.138
Coefficient of Variation	0.147		
Skewness	1.448		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.728	Shapiro Wilk Test Statistic	0.764
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.34	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	73.45
95% Adjusted-CLT UCL (Chen-1995)	74.2	95% Chebyshev (MVUE) UCL	79.94
95% Modified-t UCL (Johnson-1978)	73.55	97.5% Chebyshev (MVUE) UCL	85.06
		99% Chebyshev (MVUE) UCL	95.12

Gamma Distribution Test

k star (bias corrected)	41.46	Data Distribution	
Theta Star	1.644	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	68.14		
MLE of Standard Deviation	10.58		
nu star	995		
Approximate Chi Square Value (.05)	922.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	72.91
Adjusted Chi Square Value	912.2	95% Jackknife UCL	73.34
		95% Standard Bootstrap UCL	72.8
Anderson-Darling Test Statistic	1.633	95% Bootstrap-t UCL	79.9
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	115
Kolmogorov-Smirnov Test Statistic	0.315	95% Percentile Bootstrap UCL	72.77
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	74.38
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.78
		97.5% Chebyshev(Mean, Sd) UCL	86.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	96.98
95% Approximate Gamma UCL	73.47		
95% Adjusted Gamma UCL	74.33		

Potential UCL to Use

Use 95% Student's-t UCL 73.34
or 95% Modified-t UCL 73.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	9.87	Minimum of Log Data	2.289
Maximum	11.48	Maximum of Log Data	2.441
Mean	10.12	Mean of log Data	2.314
Median		10 SD of log Data	0.0402
SD	0.431		
Coefficient of Variation	0.0426		
Skewness	3.367		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.417	Shapiro Wilk Test Statistic	0.423
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.35	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	10.46	95% Chebyshev (MVUE) UCL	10.63
95% Modified-t UCL (Johnson-1978)	10.37	97.5% Chebyshev (MVUE) UCL	10.86
		99% Chebyshev (MVUE) UCL	11.29

Gamma Distribution Test

k star (bias corrected)	487.1	Data Distribution	
Theta Star	0.0208	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.12		
MLE of Standard Deviation	0.459		
nu star	11690		
Approximate Chi Square Value (.05)	11439	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.33
Adjusted Chi Square Value	11402	95% Jackknife UCL	10.35
		95% Standard Bootstrap UCL	10.32
Anderson-Darling Test Statistic	3.33	95% Bootstrap-t UCL	11.49
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11.82
Kolmogorov-Smirnov Test Statistic	0.45	95% Percentile Bootstrap UCL	10.37
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.38
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.66
		97.5% Chebyshev(Mean, Sd) UCL	10.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.36
95% Approximate Gamma UCL	10.34		
95% Adjusted Gamma UCL	10.38		

Potential UCL to Use	Use 95% Student's-t UCL	10.35
	or 95% Modified-t UCL	10.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-24.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

		Log-transformed Statistics	
Minimum	6.25	Minimum of Log Data	1.833
Maximum	18.79	Maximum of Log Data	2.933
Mean	10.06	Mean of log Data	2.264
Median	9.64	SD of log Data	0.305
SD	3.345		
Coefficient of Variation	0.332		
Skewness	1.565		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.84	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	11.8	95% H-UCL	12.04
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.94
95% Adjusted-CLT UCL (Chen-1995)	12.12	97.5% Chebyshev (MVUE) UCL	15.62
95% Modified-t UCL (Johnson-1978)	11.87	99% Chebyshev (MVUE) UCL	18.93

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	8.598	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.17		
MLE of Mean	10.06		
MLE of Standard Deviation	3.431		
nu star	206.3		
Approximate Chi Square Value (.05)	174.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.65
Adjusted Chi Square Value	169.6	95% Jackknife UCL	11.8
		95% Standard Bootstrap UCL	11.58
Anderson-Darling Test Statistic	0.525	95% Bootstrap-t UCL	12.4
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	20.16
Kolmogorov-Smirnov Test Statistic	0.192	95% Percentile Bootstrap UCL	11.68
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	12
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.27
		97.5% Chebyshev(Mean, Sd) UCL	16.09
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.67
95% Approximate Gamma UCL	11.92		
95% Adjusted Gamma UCL	12.24		

Potential UCL to Use		Use 95% Approximate Gamma UCL	11.92
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.58	Minimum of Log Data	-0.545
Maximum	0.7	Maximum of Log Data	-0.357
Mean	0.637	Mean of log Data	-0.452
Median	0.637	SD of log Data	0.0402
SD	0.0257		
Coefficient of Variation	0.0404		
Skewness	0.461		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.635	Shapiro Wilk Test Statistic	0.637
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.65	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.669
95% Adjusted-CLT UCL (Chen-1995)	0.65	97.5% Chebyshev (MVUE) UCL	0.683
95% Modified-t UCL (Johnson-1978)	0.65	99% Chebyshev (MVUE) UCL	0.71

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	505.2	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0013		
MLE of Mean	0.637		
MLE of Standard Deviation	0.0283		
nu star	12125		
Approximate Chi Square Value (.05)	11870	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.649
Adjusted Chi Square Value	11831	95% Jackknife UCL	0.65
		95% Standard Bootstrap UCL	0.648
Anderson-Darling Test Statistic	2.428	95% Bootstrap-t UCL	0.649
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	0.658
Kolmogorov-Smirnov Test Statistic	0.412	95% Percentile Bootstrap UCL	0.647
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	0.652
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.669
		97.5% Chebyshev(Mean, Sd) UCL	0.683
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.71
95% Approximate Gamma UCL	0.65		
95% Adjusted Gamma UCL	0.652		

Potential UCL to Use Use 95% Student's-t UCL 0.65
 or 95% Modified-t UCL 0.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	0.017 Minimum of Log Data	-4.075
Maximum	0.32 Maximum of Log Data	-1.139
Mean	0.12 Mean of log Data	-2.345
Median	0.12 SD of log Data	0.801
SD	0.074	
Coefficient of Variation	0.618	
Skewness	1.623	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.654 Shapiro Wilk Test Statistic	0.668
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.158	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.246
95% Adjusted-CLT UCL (Chen-1995)	0.165	95% Chebyshev (MVUE) UCL	0.263
95% Modified-t UCL (Johnson-1978)	0.16	97.5% Chebyshev (MVUE) UCL	0.322
		99% Chebyshev (MVUE) UCL	0.437

Gamma Distribution Test

	Data Distribution		
k star (bias corrected)	1.861	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0643		
MLE of Mean	0.12		
MLE of Standard Deviation	0.0877		
nu star	44.67		
Approximate Chi Square Value (.05)	30.34	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.155
Adjusted Chi Square Value	28.55	95% Jackknife UCL	0.158
		95% Standard Bootstrap UCL	0.153
Anderson-Darling Test Statistic	2.116	95% Bootstrap-t UCL	0.17
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	0.354
Kolmogorov-Smirnov Test Statistic	0.419	95% Percentile Bootstrap UCL	0.153
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	0.161
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.213
		97.5% Chebyshev(Mean, Sd) UCL	0.253
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.332
95% Approximate Gamma UCL	0.176		
95% Adjusted Gamma UCL	0.187		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.213

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	35.49	Log-transformed Statistics	
Maximum	57.42	Minimum of Log Data	3.569
Mean	43.36	Maximum of Log Data	4.05
Median	41.5	Mean of log Data	3.76
SD	6.442	SD of log Data	0.141
Coefficient of Variation	0.149		
Skewness	1.154		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.877	Shapiro Wilk Test Statistic	0.907
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	46.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	46.83
95% Adjusted-CLT UCL (Chen-1995)	47.08	95% Chebyshev (MVUE) UCL	51.04
95% Modified-t UCL (Johnson-1978)	46.8	97.5% Chebyshev (MVUE) UCL	54.37
		99% Chebyshev (MVUE) UCL	60.91

Gamma Distribution Test

k star (bias corrected)	40.04	Data Distribution	
Theta Star	1.083	Data appear Normal at 5% Significance Level	
MLE of Mean	43.36		
MLE of Standard Deviation	6.852		
nu star	961		
Approximate Chi Square Value (.05)	890.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	46.42
Adjusted Chi Square Value	879.6	95% Jackknife UCL	46.7
		95% Standard Bootstrap UCL	46.31
Anderson-Darling Test Statistic	0.64	95% Bootstrap-t UCL	48.16
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	47.66
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	46.52
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	47.02
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	51.46
		97.5% Chebyshev(Mean, Sd) UCL	54.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	61.86
95% Approximate Gamma UCL	46.82		
95% Adjusted Gamma UCL	47.37		

Potential UCL to Use Use 95% Student's-t UCL 46.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	10070	Minimum of Log Data	9.217
Maximum	45722	Maximum of Log Data	10.73
Mean	18110	Mean of log Data	9.715
Median	14754	SD of log Data	0.405
SD	9617		
Coefficient of Variation	0.531		
Skewness	2.47		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.699	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	23095	95% H-UCL	23059
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	27114
95% Adjusted-CLT UCL (Chen-1995)	24791	97.5% Chebyshev (MVUE) UCL	31120
95% Modified-t UCL (Johnson-1978)	23425	99% Chebyshev (MVUE) UCL	38988

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.389	Data appear Lognormal at 5% Significance Level	
Theta Star	4126		
MLE of Mean	18110		
MLE of Standard Deviation	8644		
nu star	105.3		
Approximate Chi Square Value (.05)	82.66	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	22676
Adjusted Chi Square Value	79.6	95% Jackknife UCL	23095
		95% Standard Bootstrap UCL	22534
Anderson-Darling Test Statistic	0.882	95% Bootstrap-t UCL	28763
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	39824
Kolmogorov-Smirnov Test Statistic	0.247	95% Percentile Bootstrap UCL	23002
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	24780
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30211
		97.5% Chebyshev(Mean, Sd) UCL	35447
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	45732
95% Approximate Gamma UCL	23080		
95% Adjusted Gamma UCL	23968		

Potential UCL to Use

Use 95% Student's-t UCL	23095
or 95% Modified-t UCL	23425
or 95% H-UCL	23059

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	243.4	Log-transformed Statistics	
Maximum	983.6	Minimum of Log Data	5.495
Mean	482.4	Maximum of Log Data	6.891
Median	395.2	Mean of log Data	6.085
SD	231.6	SD of log Data	0.442
Coefficient of Variation	0.48		
Skewness	1.18		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.872	Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	602.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	638.1
95% Adjusted-CLT UCL (Chen-1995)	616.7	95% Chebyshev (MVUE) UCL	751.8
95% Modified-t UCL (Johnson-1978)	606.3	97.5% Chebyshev (MVUE) UCL	869.4
		99% Chebyshev (MVUE) UCL	1101

Gamma Distribution Test

k star (bias corrected)	4.169	Data Distribution	
Theta Star	115.7	Data appear Normal at 5% Significance Level	
MLE of Mean	482.4		
MLE of Standard Deviation	236.3		
nu star	100.1		
Approximate Chi Square Value (.05)	77.97	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	592.4
Adjusted Chi Square Value	75.01	95% Jackknife UCL	602.5
		95% Standard Bootstrap UCL	587.9
Anderson-Darling Test Statistic	0.401	95% Bootstrap-t UCL	653.5
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	659.3
Kolmogorov-Smirnov Test Statistic	0.166	95% Percentile Bootstrap UCL	598.8
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	611.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	773.8
		97.5% Chebyshev(Mean, Sd) UCL	900
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1148
95% Approximate Gamma UCL	618.9		
95% Adjusted Gamma UCL	643.4		

Potential UCL to Use Use 95% Student's-t UCL 602.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0176	Minimum of Log Data	-4.04
Maximum		10 Maximum of Log Data	2.303
Mean	7.259	Mean of log Data	0.756
Median		10 SD of log Data	2.734
SD	4.443		
Coefficient of Variation	0.612		
Skewness	-1.207		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.619	Shapiro Wilk Test Statistic	0.583
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.562	95% H-UCL	20424
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	162.6
95% Adjusted-CLT UCL (Chen-1995)	8.891	97.5% Chebyshev (MVUE) UCL	217.3
95% Modified-t UCL (Johnson-1978)	9.488	99% Chebyshev (MVUE) UCL	324.5

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.442	Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.42		
MLE of Mean	7.259		
MLE of Standard Deviation	10.92		
nu star	10.61		
Approximate Chi Square Value (.05)	4.328	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9.368
Adjusted Chi Square Value	3.735	95% Jackknife UCL	9.562
		95% Standard Bootstrap UCL	9.279
Anderson-Darling Test Statistic	2.891	95% Bootstrap-t UCL	9.021
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL	8.858
Kolmogorov-Smirnov Test Statistic	0.425	95% Percentile Bootstrap UCL	9.168
Kolmogorov-Smirnov 5% Critical Value	0.258	95% BCA Bootstrap UCL	8.921
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.85
		97.5% Chebyshev(Mean, Sd) UCL	15.27
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.02
95% Approximate Gamma UCL	17.8		
95% Adjusted Gamma UCL	20.62		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 20.02
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	13.4 Minimum of Log Data	2.595
Maximum	84.13 Maximum of Log Data	4.432
Mean	60.82 Mean of log Data	3.973
Median	65 SD of log Data	0.647
SD	23.23	
Coefficient of Variation	0.382	
Skewness	-1.593	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.715 Shapiro Wilk Test Statistic	0.594
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	72.86 95% H-UCL	103.4
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	118.5
95% Adjusted-CLT UCL (Chen-1995)	68.55 97.5% Chebyshev (MVUE) UCL	142
95% Modified-t UCL (Johnson-1978)	72.35 99% Chebyshev (MVUE) UCL	188.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.957 Data do not follow a Discernable Distribution (0.05)	
Theta Star	20.57	
MLE of Mean	60.82	
MLE of Standard Deviation	35.37	
nu star	70.96	
Approximate Chi Square Value (.05)	52.57 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	71.85
Adjusted Chi Square Value	50.16 95% Jackknife UCL	72.86
	95% Standard Bootstrap UCL	71.33
Anderson-Darling Test Statistic	2.235 95% Bootstrap-t UCL	70.21
Anderson-Darling 5% Critical Value	0.736 95% Hall's Bootstrap UCL	69.23
Kolmogorov-Smirnov Test Statistic	0.452 95% Percentile Bootstrap UCL	70.66
Kolmogorov-Smirnov 5% Critical Value	0.247 95% BCA Bootstrap UCL	69.5
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	90.05
	97.5% Chebyshev(Mean, Sd) UCL	102.7
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	127.5
95% Approximate Gamma UCL	82.1	
95% Adjusted Gamma UCL	86.04	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 90.05
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0081	Minimum of Log Data	-4.816
Maximum	0.0228	Maximum of Log Data	-3.781
Mean	0.013	Mean of log Data	-4.372
Median	0.013	SD of log Data	0.26
SD	0.0036		
Coefficient of Variation	0.277		
Skewness	1.625		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.652	Shapiro Wilk Test Statistic	0.7
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0149	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0151
95% Adjusted-CLT UCL (Chen-1995)	0.0153	95% Chebyshev (MVUE) UCL	0.0173
95% Modified-t UCL (Johnson-1978)	0.015	97.5% Chebyshev (MVUE) UCL	0.0192
		99% Chebyshev (MVUE) UCL	0.0228

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	12.03	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0011		
MLE of Mean	0.013		
MLE of Standard Deviation	0.0038		
nu star	288.7		
Approximate Chi Square Value (.05)	250.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.0147
Adjusted Chi Square Value	244.9	95% Jackknife UCL	0.0149
		95% Standard Bootstrap UCL	0.0147
Anderson-Darling Test Statistic	2.043	95% Bootstrap-t UCL	0.0155
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	0.0245
Kolmogorov-Smirnov Test Statistic	0.383	95% Percentile Bootstrap UCL	0.0147
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	0.0155
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0176
		97.5% Chebyshev(Mean, Sd) UCL	0.0195
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0234
95% Approximate Gamma UCL	0.015		
95% Adjusted Gamma UCL	0.0154		

Potential UCL to Use Use 95% Student's-t UCL 0.0149
 or 95% Modified-t UCL 0.015

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-25.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Aluminum was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	5.91	Minimum of Log Data	1.777
Maximum	11	Maximum of Log Data	2.398
Mean	9.66	Mean of log Data	2.255
Median	9.66	SD of log Data	0.179
SD	1.461		
Coefficient of Variation	0.151		
Skewness	-2.048		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.706	Shapiro Wilk Test Statistic	0.644
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.51	95% H-UCL	10.83
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.07
95% Adjusted-CLT UCL (Chen-1995)	10.1	97.5% Chebyshev (MVUE) UCL	13.1
95% Modified-t UCL (Johnson-1978)	10.46	99% Chebyshev (MVUE) UCL	15.14

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	27.41	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.352		
MLE of Mean	9.66		
MLE of Standard Deviation	1.845		
nu star	548.3		
Approximate Chi Square Value (.05)	495	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	10.42
Adjusted Chi Square Value	486.2	95% Jackknife UCL	10.51
		95% Standard Bootstrap UCL	10.36
Anderson-Darling Test Statistic	1.461	95% Bootstrap-t UCL	10.27
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL	10.19
Kolmogorov-Smirnov Test Statistic	0.377	95% Percentile Bootstrap UCL	10.29
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	10.17
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.67
		97.5% Chebyshev(Mean, Sd) UCL	12.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.26
95% Approximate Gamma UCL	10.7		
95% Adjusted Gamma UCL	10.89		

Potential UCL to Use

Use 95% Student's-t UCL	10.51
or 95% Modified-t UCL	10.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations

10 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Barium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Beryllium

General Statistics

Number of Valid Observations

10 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	32.79	Minimum of Log Data	3.49
Maximum	61.25	Maximum of Log Data	4.115
Mean	47.3	Mean of log Data	3.841
Median	47.3	SD of log Data	0.183
SD	8.568		
Coefficient of Variation	0.181		
Skewness	0.283		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	52.26	95% H-UCL	53.12
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	59.3
95% Adjusted-CLT UCL (Chen-1995)	52.01	97.5% Chebyshev (MVUE) UCL	64.49
95% Modified-t UCL (Johnson-1978)	52.3	99% Chebyshev (MVUE) UCL	74.69

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	23.58	Data appear Normal at 5% Significance Level	
Theta Star	2.006		
MLE of Mean	47.3		
MLE of Standard Deviation	9.74		
nu star	471.6		
Approximate Chi Square Value (.05)	422.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	51.75
Adjusted Chi Square Value	414.1	95% Jackknife UCL	52.26
		95% Standard Bootstrap UCL	51.48
Anderson-Darling Test Statistic	0.635	95% Bootstrap-t UCL	53.15
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL	55.76
Kolmogorov-Smirnov Test Statistic	0.277	95% Percentile Bootstrap UCL	51.39
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	51.72
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	59.11
		97.5% Chebyshev(Mean, Sd) UCL	64.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	74.25
95% Approximate Gamma UCL	52.82		
95% Adjusted Gamma UCL	53.86		

Potential UCL to Use Use 95% Student's-t UCL 52.26

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	169.2	Minimum of Log Data	5.131
Maximum	1800	Maximum of Log Data	7.496
Mean	545.2	Mean of log Data	6.061
Median	545.2	SD of log Data	0.7
SD	470		
Coefficient of Variation	0.862		
Skewness	2.453		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.663	Shapiro Wilk Test Statistic	0.875
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	817.7	95% H-UCL	989.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1062
95% Adjusted-CLT UCL (Chen-1995)	912.9	97.5% Chebyshev (MVUE) UCL	1291
95% Modified-t UCL (Johnson-1978)	836.9	99% Chebyshev (MVUE) UCL	1742

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.629	Data appear Lognormal at 5% Significance Level	
Theta Star	334.6		
MLE of Mean	545.2		
MLE of Standard Deviation	427.2		
nu star	32.59		
Approximate Chi Square Value (.05)	20.54	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	789.7
Adjusted Chi Square Value	18.89	95% Jackknife UCL	817.7
		95% Standard Bootstrap UCL	773.9
Anderson-Darling Test Statistic	0.791	95% Bootstrap-t UCL	1069
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	1791
Kolmogorov-Smirnov Test Statistic	0.311	95% Percentile Bootstrap UCL	816
Kolmogorov-Smirnov 5% Critical Value	0.269	95% BCA Bootstrap UCL	904.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1193
		97.5% Chebyshev(Mean, Sd) UCL	1473
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2024
95% Approximate Gamma UCL	865.1		
95% Adjusted Gamma UCL	940.5		

Potential UCL to Use Use 95% H-UCL 989.6

ProUCL computes and outputs H-statistic based UCLs for historical reasons only. H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide. It is therefore recommended to avoid the use of H-statistic based 95% UCLs. Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	11.9 Minimum of Log Data	2.477
Maximum	65 Maximum of Log Data	4.174
Mean	54.04 Mean of log Data	3.91
Median	54.04 SD of log Data	0.511
SD	15.71	
Coefficient of Variation	0.291	
Skewness	-2.51	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.635 Shapiro Wilk Test Statistic	0.509
Shapiro Wilk Critical Value	0.842 Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	83.22
95% Adjusted-CLT UCL (Chen-1995)		95% Chebyshev (MVUE) UCL	96.28
95% Modified-t UCL (Johnson-1978)	62.5	97.5% Chebyshev (MVUE) UCL	113.7
		99% Chebyshev (MVUE) UCL	147.9

Gamma Distribution Test

k star (bias corrected)	4.549	Data Distribution	
Theta Star	11.88	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	54.04		
MLE of Standard Deviation	25.34		
nu star	90.98		

Approximate Chi Square Value (.05)	69.99	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	62.22
Adjusted Chi Square Value	66.8	95% Jackknife UCL	63.15
		95% Standard Bootstrap UCL	61.8

Anderson-Darling Test Statistic	2.036	95% Bootstrap-t UCL	60.4
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	59.33
Kolmogorov-Smirnov Test Statistic	0.453	95% Percentile Bootstrap UCL	60.45
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	59.02
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	75.7
		97.5% Chebyshev(Mean, Sd) UCL	85.08
		99% Chebyshev(Mean, Sd) UCL	103.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	70.26
95% Adjusted Gamma UCL	73.61

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 75.7

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

10 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File 194-26.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	11400	Minimum of Log Data	9.341
Maximum	12500	Maximum of Log Data	9.433
Mean	11950	Mean of log Data	9.388
Median	11950	SD of log Data	0.0196
SD	234.5		
Coefficient of Variation	0.0196		
Skewness	0		

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	12072	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12245
95% Adjusted-CLT UCL (Chen-1995)	12061	97.5% Chebyshev (MVUE) UCL	12373
95% Modified-t UCL (Johnson-1978)	12072	99% Chebyshev (MVUE) UCL	12624

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2122	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.63E+00		
MLE of Mean	11950		
MLE of Standard Deviation	259.4		
nu star	50934		
Approximate Chi Square Value (.05)	50411	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12061
Adjusted Chi Square Value	50331	95% Jackknife UCL	12072
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.744	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.444	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12245
		97.5% Chebyshev(Mean, Sd) UCL	12373
		99% Chebyshev(Mean, Sd) UCL	12624
Assuming Gamma Distribution			
95% Approximate Gamma UCL	12074		
95% Adjusted Gamma UCL	12093		

Potential UCL to Use

Use 95% Student's-t UCL 12072
 or 95% Modified-t UCL 12072

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	5.82 Minimum of Log Data	1.761
Maximum	11 Maximum of Log Data	2.398
Mean	8.625 Mean of log Data	2.137
Median	8.625 SD of log Data	0.197
SD	1.683	
Coefficient of Variation	0.195	
Skewness	0.232	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.917 Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.498	Assuming Lognormal Distribution	95% H-UCL	9.641
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL	10.78
95% Adjusted-CLT UCL (Chen-1995)	9.459		97.5% Chebyshev (MVUE) UCL	11.71
95% Modified-t UCL (Johnson-1978)	9.503		99% Chebyshev (MVUE) UCL	13.54

Gamma Distribution Test

k star (bias corrected)	21.4	Data Distribution	21.4 Data appear Normal at 5% Significance Level
Theta Star	0.403		
MLE of Mean	8.625		
MLE of Standard Deviation	1.865		
nu star	513.5		
Approximate Chi Square Value (.05)	462	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9.424
Adjusted Chi Square Value	454.5	95% Jackknife UCL	9.498
		95% Standard Bootstrap UCL	9.394
Anderson-Darling Test Statistic	0.398	95% Bootstrap-t UCL	9.542
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	9.492
Kolmogorov-Smirnov Test Statistic	0.171	95% Percentile Bootstrap UCL	9.444
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	9.399
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.74
		97.5% Chebyshev(Mean, Sd) UCL	11.66
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.46
95% Approximate Gamma UCL	9.587		
95% Adjusted Gamma UCL	9.745		

Potential UCL to Use Use 95% Student's-t UCL 9.498

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.7 Minimum of Log Data	-0.357
Maximum	0.75 Maximum of Log Data	-0.288
Mean	0.725 Mean of log Data	-0.322
Median	0.725 SD of log Data	0.0147
SD	0.0107	
Coefficient of Variation	0.0147	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.731	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.73	95% Chebyshev (MVUE) UCL	0.738
95% Modified-t UCL (Johnson-1978)	0.731	97.5% Chebyshev (MVUE) UCL	0.744
		99% Chebyshev (MVUE) UCL	0.756

Gamma Distribution Test

k star (bias corrected)	3782	Data Distribution	
Theta Star	1.92E-04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.725		
MLE of Standard Deviation	0.0118		
nu star	90778		
Approximate Chi Square Value (.05)	90079	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.73
Adjusted Chi Square Value	89972	95% Jackknife UCL	0.731
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.954	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.738
		97.5% Chebyshev(Mean, Sd) UCL	0.744
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.756
95% Approximate Gamma UCL	0.731		
95% Adjusted Gamma UCL	0.731		

Potential UCL to Use Use 95% Student's-t UCL 0.731
 or 95% Modified-t UCL 0.731

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	14.6	Minimum of Log Data	2.681
Maximum	85	Maximum of Log Data	4.443
Mean	55.34	Mean of log Data	3.885
Median	51.72	SD of log Data	0.58
SD	25.2		
Coefficient of Variation	0.455		
Skewness	-1.26E-01		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.881	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	68.4	95% H-UCL	85.27
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.34
95% Adjusted-CLT UCL (Chen-1995)	67.02	97.5% Chebyshev (MVUE) UCL	117.8
95% Modified-t UCL (Johnson-1978)	68.36	99% Chebyshev (MVUE) UCL	154

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	3.097	Data appear Normal at 5% Significance Level	
Theta Star	17.87		
MLE of Mean	55.34		
MLE of Standard Deviation	31.44		
nu star	74.33		
Approximate Chi Square Value (.05)	55.47	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	67.3
Adjusted Chi Square Value	53	95% Jackknife UCL	68.4
		95% Standard Bootstrap UCL	66.58
Anderson-Darling Test Statistic	0.649	95% Bootstrap-t UCL	68.41
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	66.21
Kolmogorov-Smirnov Test Statistic	0.196	95% Percentile Bootstrap UCL	66.53
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	66.14
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.05
		97.5% Chebyshev(Mean, Sd) UCL	100.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	127.7
95% Approximate Gamma UCL	74.14		
95% Adjusted Gamma UCL	77.61		

Potential UCL to Use	Use 95% Student's-t UCL	68.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	9.4	Minimum of Log Data	2.241
Maximum	16	Maximum of Log Data	2.773
Mean	12.7	Mean of log Data	2.536
Median	12.7	SD of log Data	0.114
SD	1.407		
Coefficient of Variation	0.111		
Skewness	-2.50E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.591
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.43	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.51
95% Adjusted-CLT UCL (Chen-1995)	13.37	95% Chebyshev (MVUE) UCL	14.53
95% Modified-t UCL (Johnson-1978)	13.43	97.5% Chebyshev (MVUE) UCL	15.32
		99% Chebyshev (MVUE) UCL	16.87

Gamma Distribution Test

k star (bias corrected)	64.55	Data Distribution	
Theta Star	0.197	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	12.7		
MLE of Standard Deviation	1.581		
nu star	1549		
Approximate Chi Square Value (.05)	1459	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	13.37
Adjusted Chi Square Value	1445	95% Jackknife UCL	13.43
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.725	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.431	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.47
		97.5% Chebyshev(Mean, Sd) UCL	15.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.74
95% Approximate Gamma UCL	13.49		
95% Adjusted Gamma UCL	13.61		

Potential UCL to Use	Use 95% Student's-t UCL	13.43
	or 95% Modified-t UCL	13.43

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	147.7 Minimum of Log Data	4.995
Maximum	904 Maximum of Log Data	6.807
Mean	489.6 Mean of log Data	6.045
Median	442.6 SD of log Data	0.596
SD	261.5	
Coefficient of Variation	0.534	
Skewness	0.518	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.876 Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	625.1 95% H-UCL	757.4
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	879.5
95% Adjusted-CLT UCL (Chen-1995)	625.8 97.5% Chebyshev (MVUE) UCL	1046
95% Modified-t UCL (Johnson-1978)	627 99% Chebyshev (MVUE) UCL	1372

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.703 Data appear Normal at 5% Significance Level	
Theta Star	181.1	
MLE of Mean	489.6	
MLE of Standard Deviation	297.8	
nu star	64.87	
Approximate Chi Square Value (.05)	47.34 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	613.7
Adjusted Chi Square Value	45.06 95% Jackknife UCL	625.1
	95% Standard Bootstrap UCL	608.1
Anderson-Darling Test Statistic	0.542 95% Bootstrap-t UCL	642.6
Anderson-Darling 5% Critical Value	0.737 95% Hall's Bootstrap UCL	619.6
Kolmogorov-Smirnov Test Statistic	0.186 95% Percentile Bootstrap UCL	610.5
Kolmogorov-Smirnov 5% Critical Value	0.247 95% BCA Bootstrap UCL	614.8
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	818.6
	97.5% Chebyshev(Mean, Sd) UCL	961
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1241
95% Approximate Gamma UCL	670.9	
95% Adjusted Gamma UCL	704.8	

Potential UCL to Use Use 95% Student's-t UCL 625.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.046	Minimum of Log Data	-3.079
Maximum	10.27	Maximum of Log Data	2.329
Mean	8.036	Mean of log Data	1.371
Median		10 SD of log Data	2.081
SD	3.81		
Coefficient of Variation	0.474		
Skewness	-1.886		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.587	Shapiro Wilk Test Statistic	0.491
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.01	95% H-UCL	861.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	87.15
95% Adjusted-CLT UCL (Chen-1995)	9.205	97.5% Chebyshev (MVUE) UCL	115
95% Modified-t UCL (Johnson-1978)	9.912	99% Chebyshev (MVUE) UCL	169.7

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.677	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.86		
MLE of Mean	8.036		
MLE of Standard Deviation	9.764		
nu star	16.26		
Approximate Chi Square Value (.05)	8.143	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9.845
Adjusted Chi Square Value	7.283	95% Jackknife UCL	10.01
		95% Standard Bootstrap UCL	9.744
Anderson-Darling Test Statistic	3.305	95% Bootstrap-t UCL	9.511
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	9.322
Kolmogorov-Smirnov Test Statistic	0.478	95% Percentile Bootstrap UCL	9.695
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL	9.368
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.83
		97.5% Chebyshev(Mean, Sd) UCL	14.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.98
95% Approximate Gamma UCL	16.04		
95% Adjusted Gamma UCL	17.94		

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	18.98
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.19 Minimum of Log Data	-1.661
Maximum	0.39 Maximum of Log Data	-0.942
Mean	0.29 Mean of log Data	-1.248
Median	0.29 SD of log Data	0.155
SD	0.0426	
Coefficient of Variation	0.147	
Skewness	-2.44E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.584
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.312	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.316
95% Adjusted-CLT UCL (Chen-1995)	0.31	95% Chebyshev (MVUE) UCL	0.347
95% Modified-t UCL (Johnson-1978)	0.312	97.5% Chebyshev (MVUE) UCL	0.372
		99% Chebyshev (MVUE) UCL	0.42

Gamma Distribution Test

k star (bias corrected)	35.73	Data Distribution	
Theta Star	0.00812	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.29		
MLE of Standard Deviation	0.0485		
nu star	857.5		
Approximate Chi Square Value (.05)	790.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.31
Adjusted Chi Square Value	780.7	95% Jackknife UCL	0.312
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.733	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.436	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.344
		97.5% Chebyshev(Mean, Sd) UCL	0.367
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.412
95% Approximate Gamma UCL	0.315		
95% Adjusted Gamma UCL	0.319		

Potential UCL to Use Use 95% Student's-t UCL 0.312
 or 95% Modified-t UCL 0.312

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	29.5	Minimum of Log Data	3.384
Maximum	44.1	Maximum of Log Data	3.786
Mean	36.8	Mean of log Data	3.602
Median	36.8	SD of log Data	0.0861
SD	3.113		
Coefficient of Variation	0.0846		
Skewness	-4.11E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.595
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	38.41	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	40.79
95% Adjusted-CLT UCL (Chen-1995)	38.28	97.5% Chebyshev (MVUE) UCL	42.52
95% Modified-t UCL (Johnson-1978)	38.41	99% Chebyshev (MVUE) UCL	45.91

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	112.3	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.328		
MLE of Mean	36.8		
MLE of Standard Deviation	3.473		
nu star	2695		
Approximate Chi Square Value (.05)	2575	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	38.28
Adjusted Chi Square Value	2557	95% Jackknife UCL	38.41
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.72	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.428	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	40.72
		97.5% Chebyshev(Mean, Sd) UCL	42.41
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	45.74
95% Approximate Gamma UCL	38.51		
95% Adjusted Gamma UCL	38.78		

Potential UCL to Use	Use 95% Student's-t UCL	38.41
	or 95% Modified-t UCL	38.41

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-27.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.27	Log-transformed Statistics	
Maximum	0.64	Minimum of Log Data	-1.309
Mean	0.455	Maximum of Log Data	-0.446
Median	0.455	Mean of log Data	-0.803
SD	0.0789	SD of log Data	0.187
Coefficient of Variation	0.173		
Skewness	-2.51E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.578
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.496	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.506
95% Adjusted-CLT UCL (Chen-1995)	0.492	95% Chebyshev (MVUE) UCL	0.563
95% Modified-t UCL (Johnson-1978)	0.496	97.5% Chebyshev (MVUE) UCL	0.61
		99% Chebyshev (MVUE) UCL	0.701

Gamma Distribution Test

k star (bias corrected)	25.08	Data Distribution	
Theta Star	0.0181	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.455		
MLE of Standard Deviation	0.0909		
nu star	602		
Approximate Chi Square Value (.05)	546.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.492
Adjusted Chi Square Value	537.9	95% Jackknife UCL	0.496
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.742	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.44	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.554
		97.5% Chebyshev(Mean, Sd) UCL	0.597
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.682
95% Approximate Gamma UCL	0.502		
95% Adjusted Gamma UCL	0.509		

Potential UCL to Use

Use 95% Student's-t UCL	0.496
or 95% Modified-t UCL	0.496

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	5.38 Minimum of Log Data	1.683
Maximum	16.08 Maximum of Log Data	2.778
Mean	9.11 Mean of log Data	2.162
Median	9.11 SD of log Data	0.322
SD	2.974	
Coefficient of Variation	0.326	
Skewness	0.921	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.902 Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.65 95% H-UCL	11.05
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12.84
95% Adjusted-CLT UCL (Chen-1995)	10.77 97.5% Chebyshev (MVUE) UCL	14.45
95% Modified-t UCL (Johnson-1978)	10.69 99% Chebyshev (MVUE) UCL	17.62

Gamma Distribution Test

k star (bias corrected)	8.101 Data appear Normal at 5% Significance Level	
Theta Star	1.125	
MLE of Mean	9.11	
MLE of Standard Deviation	3.201	
nu star	194.4	
Approximate Chi Square Value (.05)	163.2 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	10.52
Adjusted Chi Square Value	158.8 95% Jackknife UCL	10.65
	95% Standard Bootstrap UCL	10.49
Anderson-Darling Test Statistic	0.418 95% Bootstrap-t UCL	10.94
Anderson-Darling 5% Critical Value	0.73 95% Hall's Bootstrap UCL	11.59
Kolmogorov-Smirnov Test Statistic	0.147 95% Percentile Bootstrap UCL	10.47
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	10.73
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.85
	97.5% Chebyshev(Mean, Sd) UCL	14.47
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	17.65
95% Approximate Gamma UCL	10.86	
95% Adjusted Gamma UCL	11.15	

Potential UCL to Use Use 95% Student's-t UCL 10.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

	Log-transformed Statistics		
Minimum	42.55	Minimum of Log Data	3.751
Maximum	57.43	Maximum of Log Data	4.051
Mean	49.41	Mean of log Data	3.897
Median	49.41	SD of log Data	0.0852
SD	4.247		
Coefficient of Variation	0.0859		
Skewness	0.416		

Relevant UCL Statistics

	Lognormal Distribution Test		
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.969	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution		
95% Student's-t UCL	51.61	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	54.72
95% Adjusted-CLT UCL (Chen-1995)	51.59	97.5% Chebyshev (MVUE) UCL	57.01
95% Modified-t UCL (Johnson-1978)	51.64	99% Chebyshev (MVUE) UCL	61.52

Gamma Distribution Test

	Data Distribution		
k star (bias corrected)	112.3	Data appear Normal at 5% Significance Level	
Theta Star	0.44		
MLE of Mean	49.41		
MLE of Standard Deviation	4.663		
nu star	2695		
Approximate Chi Square Value (.05)	2575	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	51.43
Adjusted Chi Square Value	2557	95% Jackknife UCL	51.61
		95% Standard Bootstrap UCL	51.32
Anderson-Darling Test Statistic	0.229	95% Bootstrap-t UCL	51.95
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	51.91
Kolmogorov-Smirnov Test Statistic	0.156	95% Percentile Bootstrap UCL	51.44
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	51.61
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	54.76
		97.5% Chebyshev(Mean, Sd) UCL	57.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	61.61
95% Approximate Gamma UCL	51.71		
95% Adjusted Gamma UCL	52.07		

Potential UCL to Use	Use 95% Student's-t UCL	51.61
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	10.2	Minimum of Log Data	2.322
Maximum	65.5	Maximum of Log Data	4.182
Mean	52.17	Mean of log Data	3.812
Median	61.1	SD of log Data	0.673
SD	20.05		
Coefficient of Variation	0.384		
Skewness	-1.731		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.67	Shapiro Wilk Test Statistic	0.581
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	62.56	95% H-UCL	91.77
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	104.3
95% Adjusted-CLT UCL (Chen-1995)	58.6	97.5% Chebyshev (MVUE) UCL	125.4
95% Modified-t UCL (Johnson-1978)	62.08	99% Chebyshev (MVUE) UCL	166.9

Gamma Distribution Test

k star (bias corrected)	2.799	Data Distribution	
Theta Star	18.64	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	52.17		
MLE of Standard Deviation	31.18		
nu star	67.17		
Approximate Chi Square Value (.05)	49.31	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	61.69
Adjusted Chi Square Value	46.98	95% Jackknife UCL	62.56
		95% Standard Bootstrap UCL	61.23
Anderson-Darling Test Statistic	2.27	95% Bootstrap-t UCL	59.99
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	59.01
Kolmogorov-Smirnov Test Statistic	0.403	95% Percentile Bootstrap UCL	60.71
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	58.93
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	77.39
		97.5% Chebyshev(Mean, Sd) UCL	88.31
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	109.8
95% Approximate Gamma UCL	71.06		
95% Adjusted Gamma UCL	74.58		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	77.39
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	0.033 Minimum of Log Data	-3.411
Maximum	10.3 Maximum of Log Data	2.332
Mean	7.862 Mean of log Data	1.32
Median	10 SD of log Data	2.146
SD	3.784	
Coefficient of Variation	0.481	
Skewness	-1.77	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.646 Shapiro Wilk Test Statistic	0.509
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	9.824 95% H-UCL	1143
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	93.35
95% Adjusted-CLT UCL (Chen-1995)	9.062 97.5% Chebyshev (MVUE) UCL	123.4
95% Modified-t UCL (Johnson-1978)	9.731 99% Chebyshev (MVUE) UCL	182.4

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.655 Data do not follow a Discernable Distribution (0.05)	
Theta Star	12	
MLE of Mean	7.862	
MLE of Standard Deviation	9.712	
nu star	15.73	
Approximate Chi Square Value (.05)	7.769 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	9.659
Adjusted Chi Square Value	6.932 95% Jackknife UCL	9.824
	95% Standard Bootstrap UCL	9.592
Anderson-Darling Test Statistic	3.096 95% Bootstrap-t UCL	9.276
Anderson-Darling 5% Critical Value	0.764 95% Hall's Bootstrap UCL	9.191
Kolmogorov-Smirnov Test Statistic	0.48 95% Percentile Bootstrap UCL	9.509
Kolmogorov-Smirnov 5% Critical Value	0.254 95% BCA Bootstrap UCL	9.162
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.62
	97.5% Chebyshev(Mean, Sd) UCL	14.68
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.73
95% Approximate Gamma UCL	15.91	
95% Adjusted Gamma UCL	17.84	

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 18.73

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-28.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.93	Minimum of Log Data	1.78
Maximum	14.8	Maximum of Log Data	2.695
Mean	9.808	Mean of log Data	2.243
Median	10.38	SD of log Data	0.301
SD	2.84		
Coefficient of Variation	0.29		
Skewness	0.21		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.937	Shapiro Wilk Test Statistic	0.93
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.28	95% H-UCL	11.74
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.57
95% Adjusted-CLT UCL (Chen-1995)	11.21	97.5% Chebyshev (MVUE) UCL	15.19
95% Modified-t UCL (Johnson-1978)	11.29	99% Chebyshev (MVUE) UCL	18.38

Gamma Distribution Test

k star (bias corrected)	9.492	Data Distribution	
Theta Star	1.033	Data appear Normal at 5% Significance Level	
MLE of Mean	9.808		
MLE of Standard Deviation	3.183		
nu star	227.8		
Approximate Chi Square Value (.05)	193.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.16
Adjusted Chi Square Value	189.1	95% Jackknife UCL	11.28
		95% Standard Bootstrap UCL	11.1
Anderson-Darling Test Statistic	0.385	95% Bootstrap-t UCL	11.41
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11.31
Kolmogorov-Smirnov Test Statistic	0.162	95% Percentile Bootstrap UCL	11.09
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.08
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.38
		97.5% Chebyshev(Mean, Sd) UCL	14.93
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.97
95% Approximate Gamma UCL	11.52		
95% Adjusted Gamma UCL	11.82		

Potential UCL to Use

		Use 95% Student's-t UCL	11.28
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.71	Minimum of Log Data	-0.342
Maximum	0.76	Maximum of Log Data	-0.274
Mean	0.735	Mean of log Data	-0.308
Median	0.735	SD of log Data	0.0145
SD	0.0107		
Coefficient of Variation	0.0145		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.741	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.74	95% Chebyshev (MVUE) UCL	0.748
95% Modified-t UCL (Johnson-1978)	0.741	97.5% Chebyshev (MVUE) UCL	0.754
		99% Chebyshev (MVUE) UCL	0.766

Gamma Distribution Test

k star (bias corrected)		Data Distribution	
Theta Star	1.89E-04	3888 Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.735		
MLE of Standard Deviation	0.0118		
nu star	93301		
Approximate Chi Square Value (.05)	92592	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.74
Adjusted Chi Square Value	92484	95% Jackknife UCL	0.741
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.973	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.497	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.748
		97.5% Chebyshev(Mean, Sd) UCL	0.754
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.766
95% Approximate Gamma UCL	0.741		
95% Adjusted Gamma UCL	0.741		

Potential UCL to Use		Use 95% Student's-t UCL	0.741
		or 95% Modified-t UCL	0.741

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	35.39	Minimum of Log Data	3.566
Maximum	86.43	Maximum of Log Data	4.459
Mean	54.99	Mean of log Data	3.968
Median	47.73	SD of log Data	0.288
SD	16.57		
Coefficient of Variation	0.301		
Skewness	0.789		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.58	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	65.1
95% Adjusted-CLT UCL (Chen-1995)	64.02	95% Chebyshev (MVUE) UCL	75
95% Modified-t UCL (Johnson-1978)	63.76	97.5% Chebyshev (MVUE) UCL	83.69
		99% Chebyshev (MVUE) UCL	100.8

Gamma Distribution Test

k star (bias corrected)	9.756	Data Distribution	
Theta Star	5.636	Data appear Normal at 5% Significance Level	
MLE of Mean	54.99		
MLE of Standard Deviation	17.6		
nu star	234.1	Nonparametric Statistics	
Approximate Chi Square Value (.05)	199.7	95% CLT UCL	62.86
Adjusted Level of Significance	0.029	95% Jackknife UCL	63.58
Adjusted Chi Square Value	194.9	95% Standard Bootstrap UCL	62.72
Anderson-Darling Test Statistic	0.456	95% Bootstrap-t UCL	64.78
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	63.83
Kolmogorov-Smirnov Test Statistic	0.229	95% Percentile Bootstrap UCL	62.95
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	64.11
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	75.84
		97.5% Chebyshev(Mean, Sd) UCL	84.87
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	102.6
95% Approximate Gamma UCL	64.46		
95% Adjusted Gamma UCL	66.07		

Potential UCL to Use Use 95% Student's-t UCL 63.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	264.7 Minimum of Log Data	5.579
Maximum	2400 Maximum of Log Data	7.783
Mean	799.1 Mean of log Data	6.433
Median	566 SD of log Data	0.715
SD	642.3	
Coefficient of Variation	0.804	
Skewness	1.598	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.796 Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1132 95% H-UCL	1358
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1518
95% Adjusted-CLT UCL (Chen-1995)	1195 97.5% Chebyshev (MVUE) UCL	1837
95% Modified-t UCL (Johnson-1978)	1146 99% Chebyshev (MVUE) UCL	2462

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.667 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	479.2	
MLE of Mean	799.1	
MLE of Standard Deviation	618.8	
nu star	40.02	
Approximate Chi Square Value (.05)	26.52 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	1104
Adjusted Chi Square Value	24.86 95% Jackknife UCL	1132
	95% Standard Bootstrap UCL	1090
Anderson-Darling Test Statistic	0.614 95% Bootstrap-t UCL	1315
Anderson-Darling 5% Critical Value	0.741 95% Hall's Bootstrap UCL	1223
Kolmogorov-Smirnov Test Statistic	0.231 95% Percentile Bootstrap UCL	1108
Kolmogorov-Smirnov 5% Critical Value	0.248 95% BCA Bootstrap UCL	1192
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1607
	97.5% Chebyshev(Mean, Sd) UCL	1957
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2644
95% Approximate Gamma UCL	1206	
95% Adjusted Gamma UCL	1286	

Potential UCL to Use Use 95% Approximate Gamma UCL 1206

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	13.6 Minimum of Log Data	2.61
Maximum	69.74 Maximum of Log Data	4.245
Mean	61.05 Mean of log Data	4.048
Median	65 SD of log Data	0.455
SD	15.18	
Coefficient of Variation	0.249	
Skewness	-3.275	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.469 Shapiro Wilk Test Statistic	0.4
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.92	95% H-UCL	84.61
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.71
95% Adjusted-CLT UCL (Chen-1995)	63.83	97.5% Chebyshev (MVUE) UCL	115.6
95% Modified-t UCL (Johnson-1978)	68.23	99% Chebyshev (MVUE) UCL	146.9

Gamma Distribution Test

k star (bias corrected)	6.098	Data Distribution	
Theta Star	10.01	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.05		
MLE of Standard Deviation	24.72		
nu star	146.4		
Approximate Chi Square Value (.05)	119.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	68.26
Adjusted Chi Square Value	115.7	95% Jackknife UCL	68.92
		95% Standard Bootstrap UCL	67.83
Anderson-Darling Test Statistic	3.299	95% Bootstrap-t UCL	66.25
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	65.44
Kolmogorov-Smirnov Test Statistic	0.45	95% Percentile Bootstrap UCL	66.15
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	65.63
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.15
		97.5% Chebyshev(Mean, Sd) UCL	88.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.7
95% Approximate Gamma UCL	74.83		
95% Adjusted Gamma UCL	77.23		

Potential UCL to Use

Use 95% Student's-t UCL 68.92
or 95% Modified-t UCL 68.23

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.033	Minimum of Log Data	-3.411
Maximum	15.2	Maximum of Log Data	2.721
Mean	10.02	Mean of log Data	1.9
Median	10	SD of log Data	1.677
SD	3.486		
Coefficient of Variation	0.348		
Skewness	-2.173		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.675	Shapiro Wilk Test Statistic	0.389
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	11.82	95% H-UCL	236
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	72.34
95% Adjusted-CLT UCL (Chen-1995)	11	97.5% Chebyshev (MVUE) UCL	94.19
95% Modified-t UCL (Johnson-1978)	11.72	99% Chebyshev (MVUE) UCL	137.1

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.09	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.186		
MLE of Mean	10.02		
MLE of Standard Deviation	9.592		
nu star	26.17		
Approximate Chi Square Value (.05)	15.51	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.67
Adjusted Chi Square Value	14.27	95% Jackknife UCL	11.82
		95% Standard Bootstrap UCL	11.59
Anderson-Darling Test Statistic	3.344	95% Bootstrap-t UCL	11.3
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	11.2
Kolmogorov-Smirnov Test Statistic	0.529	95% Percentile Bootstrap UCL	11.39
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	11.2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.4
		97.5% Chebyshev(Mean, Sd) UCL	16.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.03
95% Approximate Gamma UCL	16.9		
95% Adjusted Gamma UCL	18.37		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 20.03

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	35.2	Minimum of Log Data	3.561
Maximum	40.6	Maximum of Log Data	3.704
Mean	37.9	Mean of log Data	3.635
Median	37.9	SD of log Data	0.0304
SD	1.151		
Coefficient of Variation	0.0304		
Skewness	1.09E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	38.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	38.45	95% Chebyshev (MVUE) UCL	39.35
95% Modified-t UCL (Johnson-1978)	38.5	97.5% Chebyshev (MVUE) UCL	39.98
		99% Chebyshev (MVUE) UCL	41.21

Gamma Distribution Test

k star (bias corrected)	884.6	Data Distribution	
Theta Star	0.0428	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	37.9		
MLE of Standard Deviation	1.274		
nu star	21230		
Approximate Chi Square Value (.05)	20893	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	38.45
Adjusted Chi Square Value	20841	95% Jackknife UCL	38.5
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.714	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.419	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.35
		97.5% Chebyshev(Mean, Sd) UCL	39.98
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	41.21
95% Approximate Gamma UCL	38.51		
95% Adjusted Gamma UCL	38.61		

Potential UCL to Use Use 95% Student's-t UCL 38.5
 or 95% Modified-t UCL 38.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-30.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11
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Raw Statistics

		Log-transformed Statistics	
Minimum	5	Minimum of Log Data	1.609
Maximum	13.19	Maximum of Log Data	2.579
Mean	8.341	Mean of log Data	2.089
Median	8.341	SD of log Data	0.263
SD	2.23		
Coefficient of Variation	0.267		
Skewness	0.715		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.443	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.645
95% Adjusted-CLT UCL (Chen-1995)	9.489	95% Chebyshev (MVUE) UCL	11.01
95% Modified-t UCL (Johnson-1978)	9.464	97.5% Chebyshev (MVUE) UCL	12.17
		99% Chebyshev (MVUE) UCL	14.44

Gamma Distribution Test

k star (bias corrected)	12.17	Data Distribution	
Theta Star	0.686	Data appear Normal at 5% Significance Level	
MLE of Mean	8.341		
MLE of Standard Deviation	2.391		
nu star	316.4		
Approximate Chi Square Value (.05)	276.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.358
Adjusted Chi Square Value	270.8	95% Jackknife UCL	9.443
		95% Standard Bootstrap UCL	9.32
Anderson-Darling Test Statistic	0.265	95% Bootstrap-t UCL	9.773
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	9.697
Kolmogorov-Smirnov Test Statistic	0.159	95% Percentile Bootstrap UCL	9.309
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	9.445
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.04
		97.5% Chebyshev(Mean, Sd) UCL	12.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.49
95% Approximate Gamma UCL	9.555		
95% Adjusted Gamma UCL	9.744		

Potential UCL to Use

	Use 95% Student's-t UCL	9.443
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics

Minimum	0.34	Log-transformed Statistics	
Maximum	4.8	Minimum of Log Data	-1.079
Mean	1.937	Maximum of Log Data	1.569
Median	1.937	Mean of log Data	0.515
SD	1.015	SD of log Data	0.626
Coefficient of Variation	0.524		
Skewness	1.638		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.64	Shapiro Wilk Test Statistic	0.668
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.438	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3.069
95% Adjusted-CLT UCL (Chen-1995)	2.536	95% Chebyshev (MVUE) UCL	3.574
95% Modified-t UCL (Johnson-1978)	2.46	97.5% Chebyshev (MVUE) UCL	4.255
		99% Chebyshev (MVUE) UCL	5.592

Gamma Distribution Test

k star (bias corrected)	2.813	Data Distribution	
Theta Star	0.688	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.937		
MLE of Standard Deviation	1.155		
nu star	73.15		

Approximate Chi Square Value (.05)	54.45	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	2.4
Adjusted Chi Square Value	52.16	95% Jackknife UCL	2.438
		95% Standard Bootstrap UCL	2.395
Anderson-Darling Test Statistic	2.331	95% Bootstrap-t UCL	2.58
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	5.081
Kolmogorov-Smirnov Test Statistic	0.416	95% Percentile Bootstrap UCL	2.377
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	2.475
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.163
		97.5% Chebyshev(Mean, Sd) UCL	3.694
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.736
95% Approximate Gamma UCL	2.602		
95% Adjusted Gamma UCL	2.716		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 3.163

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 11

Raw Statistics

Minimum	37.64	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.628
Mean	50.97	Maximum of Log Data	4.443
Median	50.97	Mean of log Data	3.909
SD	12.09	SD of log Data	0.211
Coefficient of Variation	0.237		
Skewness	1.916		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	56.95	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	57.03
95% Adjusted-CLT UCL (Chen-1995)	58.39	95% Chebyshev (MVUE) UCL	63.95
95% Modified-t UCL (Johnson-1978)	57.25	97.5% Chebyshev (MVUE) UCL	69.6
		99% Chebyshev (MVUE) UCL	80.69

Gamma Distribution Test

k star (bias corrected)	17.61	Data Distribution	
Theta Star	2.894	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	50.97		
MLE of Standard Deviation	12.15		
nu star	457.9		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301	Nonparametric Statistics	
Adjusted Chi Square Value	402.8	95% CLT UCL	56.49
		95% Jackknife UCL	56.95
		95% Standard Bootstrap UCL	56.49

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.547	95% Bootstrap-t UCL	59.83
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	84.8
Kolmogorov-Smirnov Test Statistic	0.164	95% Percentile Bootstrap UCL	56.52
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	58.13
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	65.59
		97.5% Chebyshev(Mean, Sd) UCL	71.91
		99% Chebyshev(Mean, Sd) UCL	84.33

Assuming Gamma Distribution

95% Approximate Gamma UCL	57.03
95% Adjusted Gamma UCL	57.95

Potential UCL to Use

Use 95% Approximate Gamma UCL 57.03

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 11

Raw Statistics

Minimum	218.9	Log-transformed Statistics	
Maximum	1241	Minimum of Log Data	5.389
Mean	485.1	Maximum of Log Data	7.123
Median	460.5	Mean of log Data	6.09
SD	257.2	SD of log Data	0.426
Coefficient of Variation	0.53		
Skewness	2.351		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.74	Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	612.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	620.3
95% Adjusted-CLT UCL (Chen-1995)	652.1	95% Chebyshev (MVUE) UCL	731.5
95% Modified-t UCL (Johnson-1978)	620	97.5% Chebyshev (MVUE) UCL	840.5
		99% Chebyshev (MVUE) UCL	1055

Gamma Distribution Test

k star (bias corrected)	4.247	Data Distribution	
Theta Star	114.2	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	485.1		
MLE of Standard Deviation	235.4		
nu star	110.4		
Approximate Chi Square Value (.05)	87.18	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	602.4
Adjusted Chi Square Value	84.24	95% Jackknife UCL	612.2
		95% Standard Bootstrap UCL	596.7
Anderson-Darling Test Statistic	0.688	95% Bootstrap-t UCL	727.4
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	1182
Kolmogorov-Smirnov Test Statistic	0.212	95% Percentile Bootstrap UCL	606.5
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	646.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	796
		97.5% Chebyshev(Mean, Sd) UCL	930.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1195
95% Approximate Gamma UCL	614.5		
95% Adjusted Gamma UCL	635.9		

Potential UCL to Use

Use 95% Approximate Gamma UCL 614.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0271	Minimum of Log Data	-3.608
Maximum	10	Maximum of Log Data	2.303
Mean	7.687	Mean of log Data	1.458
Median	8.8	SD of log Data	1.854
SD	3.513		
Coefficient of Variation	0.457		
Skewness	-1.802		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.665	Shapiro Wilk Test Statistic	0.517
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.423	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	259.5
95% Adjusted-CLT UCL (Chen-1995)	8.769	95% Chebyshev (MVUE) UCL	63.51
95% Modified-t UCL (Johnson-1978)	9.342	97.5% Chebyshev (MVUE) UCL	83.12
		99% Chebyshev (MVUE) UCL	121.6

Gamma Distribution Test

k star (bias corrected)	0.815	Data Distribution	
Theta Star	9.43	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.687		
MLE of Standard Deviation	8.514		
nu star	21.19		
Approximate Chi Square Value (.05)	11.74	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.289
Adjusted Chi Square Value	10.74	95% Jackknife UCL	9.423
		95% Standard Bootstrap UCL	9.267
Anderson-Darling Test Statistic	3.076	95% Bootstrap-t UCL	8.995
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	8.853
Kolmogorov-Smirnov Test Statistic	0.479	95% Percentile Bootstrap UCL	9.11
Kolmogorov-Smirnov 5% Critical Value	0.243	95% BCA Bootstrap UCL	8.937
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.93
		97.5% Chebyshev(Mean, Sd) UCL	13.77
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.38
95% Approximate Gamma UCL	13.88		
95% Adjusted Gamma UCL	15.16		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.38
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 10

Raw Statistics

Minimum	7.2	Minimum of Log Data	1.974
Maximum	69.87	Maximum of Log Data	4.247
Mean	53.76	Mean of log Data	3.823
Median	60.71	SD of log Data	0.739
SD	20.56		
Coefficient of Variation	0.382		
Skewness	-1.884		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.679	Shapiro Wilk Test Statistic	0.569
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.93	95% H-UCL	100.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	113.5
95% Adjusted-CLT UCL (Chen-1995)	59.96	97.5% Chebyshev (MVUE) UCL	137.3
95% Modified-t UCL (Johnson-1978)	63.43	99% Chebyshev (MVUE) UCL	184

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	2.549	Data Distribution	
Theta Star	21.09	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	53.76		
MLE of Standard Deviation	33.67		
nu star	66.29		
Approximate Chi Square Value (.05)	48.55	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	63.14
Adjusted Chi Square Value	46.39	95% Jackknife UCL	63.93
		95% Standard Bootstrap UCL	62.58
Anderson-Darling Test Statistic	2.529	95% Bootstrap-t UCL	61.71
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	60.37
Kolmogorov-Smirnov Test Statistic	0.42	95% Percentile Bootstrap UCL	62.04
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	60.79
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.62
		97.5% Chebyshev(Mean, Sd) UCL	89.37
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	110.5
95% Approximate Gamma UCL	73.4		
95% Adjusted Gamma UCL	76.82		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 78.62
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 7

Raw Statistics

Minimum	0.03	Log-transformed Statistics	
Maximum	10.38	Minimum of Log Data	-3.507
Mean	8.386	Maximum of Log Data	2.34
Median	9.76	Mean of log Data	1.743
SD	3.023	SD of log Data	1.597
Coefficient of Variation	0.36		
Skewness	-2.261		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.644	Shapiro Wilk Test Statistic	0.407
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.88	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	127.1
95% Adjusted-CLT UCL (Chen-1995)	9.203	95% Chebyshev (MVUE) UCL	53.79
95% Modified-t UCL (Johnson-1978)	9.793	97.5% Chebyshev (MVUE) UCL	69.68
		99% Chebyshev (MVUE) UCL	100.9

Gamma Distribution Test

k star (bias corrected)	1.165	Data Distribution	
Theta Star	7.196	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.386		
MLE of Standard Deviation	7.768		
nu star	30.3		
Approximate Chi Square Value (.05)	18.73	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.765
Adjusted Chi Square Value	17.44	95% Jackknife UCL	9.88
		95% Standard Bootstrap UCL	9.725
Anderson-Darling Test Statistic	3.243	95% Bootstrap-t UCL	9.491
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	9.353
Kolmogorov-Smirnov Test Statistic	0.456	95% Percentile Bootstrap UCL	9.58
Kolmogorov-Smirnov 5% Critical Value	0.241	95% BCA Bootstrap UCL	9.378
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.04
		97.5% Chebyshev(Mean, Sd) UCL	13.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.73
95% Approximate Gamma UCL	13.57		
95% Adjusted Gamma UCL	14.57		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 16.73

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

Minimum	16.8	Log-transformed Statistics	
Maximum	37	Minimum of Log Data	2.821
Mean	25.8	Maximum of Log Data	3.611
Median	25.8	Mean of log Data	3.238
SD	4.196	SD of log Data	0.163
Coefficient of Variation	0.163		
Skewness	0.887		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.632	Shapiro Wilk Test Statistic	0.64
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	27.87	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	28.12
95% Adjusted-CLT UCL (Chen-1995)	28.02	95% Chebyshev (MVUE) UCL	30.91
95% Modified-t UCL (Johnson-1978)	27.92	97.5% Chebyshev (MVUE) UCL	33.13
		99% Chebyshev (MVUE) UCL	37.47

Gamma Distribution Test

k star (bias corrected)	31.91	Data Distribution	
Theta Star	0.809	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	25.8		
MLE of Standard Deviation	4.567		
nu star	829.6		
Approximate Chi Square Value (.05)	763.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	27.71
Adjusted Chi Square Value	754.8	95% Jackknife UCL	27.87
		95% Standard Bootstrap UCL	27.66
Anderson-Darling Test Statistic	2.546	95% Bootstrap-t UCL	28.01
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	30.1
Kolmogorov-Smirnov Test Statistic	0.402	95% Percentile Bootstrap UCL	27.69
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	27.69
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30.87
		97.5% Chebyshev(Mean, Sd) UCL	33.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	37.38
95% Approximate Gamma UCL	28.02		
95% Adjusted Gamma UCL	28.36		

Potential UCL to Use	Use 95% Student's-t UCL	27.87
	or 95% Modified-t UCL	27.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 6

Raw Statistics

Minimum	32.65	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.486
Mean	71.97	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.212
SD	22.45	SD of log Data	0.398
Coefficient of Variation	0.312		
Skewness	-1.183		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.572	Shapiro Wilk Test Statistic	0.581
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	80.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	87.48
95% Adjusted-CLT UCL (Chen-1995)	78.94	95% Chebyshev (MVUE) UCL	102.4
95% Modified-t UCL (Johnson-1978)	80.66	97.5% Chebyshev (MVUE) UCL	115.2
		99% Chebyshev (MVUE) UCL	140.4

Gamma Distribution Test

k star (bias corrected)	6.734	Data Distribution	
Theta Star	10.69	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	71.97		
MLE of Standard Deviation	27.73		
nu star	255.9		
Approximate Chi Square Value (.05)	219.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	80.44
Adjusted Chi Square Value	217	95% Jackknife UCL	80.9
		95% Standard Bootstrap UCL	79.87
Anderson-Darling Test Statistic	4.226	95% Bootstrap-t UCL	79.15
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	78.44
Kolmogorov-Smirnov Test Statistic	0.462	95% Percentile Bootstrap UCL	79.81
Kolmogorov-Smirnov 5% Critical Value	0.199	95% BCA Bootstrap UCL	79.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.41
		97.5% Chebyshev(Mean, Sd) UCL	104.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	123.2
95% Approximate Gamma UCL	83.76		
95% Adjusted Gamma UCL	84.89		

Potential UCL to Use

Use 95% Student's-t UCL 80.9
or 95% Modified-t UCL 80.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 3

Raw Statistics

Minimum	0.0247	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.701
Mean	9.302	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.966
SD	2.37	SD of log Data	1.375
Coefficient of Variation	0.255		
Skewness	-3.78		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.34	Shapiro Wilk Test Statistic	0.267
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.24	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	51.57
95% Adjusted-CLT UCL (Chen-1995)	9.692	95% Chebyshev (MVUE) UCL	44.03
95% Modified-t UCL (Johnson-1978)	10.17	97.5% Chebyshev (MVUE) UCL	55.78
		99% Chebyshev (MVUE) UCL	78.87

Gamma Distribution Test

k star (bias corrected)	1.754	Data Distribution	
Theta Star	5.305	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.302		
MLE of Standard Deviation	7.024		
nu star	66.63		
Approximate Chi Square Value (.05)	48.85	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	10.2
Adjusted Chi Square Value	47.52	95% Jackknife UCL	10.24
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	6.574	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.527	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.201	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.67
		97.5% Chebyshev(Mean, Sd) UCL	12.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.71
95% Approximate Gamma UCL	12.69		
95% Adjusted Gamma UCL	13.04		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.67
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 3

Raw Statistics

Minimum	7.5	Minimum of Log Data	2.015
Maximum	65	Maximum of Log Data	4.174
Mean	61.63	Mean of log Data	4.055
Median	65	SD of log Data	0.495
SD	13.19		
Coefficient of Variation	0.214		
Skewness	-4.27		

Log-transformed Statistics

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.283	Shapiro Wilk Test Statistic	0.261
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.88	95% H-UCL	82.36
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	97.88
95% Adjusted-CLT UCL (Chen-1995)	63.44	97.5% Chebyshev (MVUE) UCL	112.2
95% Modified-t UCL (Johnson-1978)	66.38	99% Chebyshev (MVUE) UCL	140.4

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	6.553	Data Distribution	
Theta Star	9.405	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.63		
MLE of Standard Deviation	24.08		
nu star	249		
Approximate Chi Square Value (.05)	213.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	66.61
Adjusted Chi Square Value	210.6	95% Jackknife UCL	66.88

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.742	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.501	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.199	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	74.82
		97.5% Chebyshev(Mean, Sd) UCL	80.53
		99% Chebyshev(Mean, Sd) UCL	91.74

Assuming Gamma Distribution

95% Approximate Gamma UCL	71.89
95% Adjusted Gamma UCL	72.87

Potential UCL to Use

Use 95% Student's-t UCL	66.88
or 95% Modified-t UCL	66.38

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 19 Number of Distinct Observations 4

Raw Statistics

Minimum	0.037	Log-transformed Statistics	
Maximum	10.93	Minimum of Log Data	-3.297
Mean	9.524	Maximum of Log Data	2.392
Median		Mean of log Data	2.013
SD	2.307	10 SD of log Data	1.286
Coefficient of Variation	0.242		
Skewness	-4.293		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.287	Shapiro Wilk Test Statistic	0.251
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.44	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	42.98
95% Adjusted-CLT UCL (Chen-1995)	9.838	95% Chebyshev (MVUE) UCL	39.65
95% Modified-t UCL (Johnson-1978)	10.36	97.5% Chebyshev (MVUE) UCL	49.92
		99% Chebyshev (MVUE) UCL	70.09

Gamma Distribution Test

k star (bias corrected)	1.908	Data Distribution	
Theta Star	4.991	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.524		
MLE of Standard Deviation	6.895		
nu star	72.51		

Approximate Chi Square Value (.05)	53.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0369	95% CLT UCL	10.39
Adjusted Chi Square Value	52.5	95% Jackknife UCL	10.44
		95% Standard Bootstrap UCL	10.38

Anderson-Darling Test Statistic	6.973	95% Bootstrap-t UCL	10.17
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	10.06
Kolmogorov-Smirnov Test Statistic	0.564	95% Percentile Bootstrap UCL	10.1
Kolmogorov-Smirnov 5% Critical Value	0.201	95% BCA Bootstrap UCL	10.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.83
		97.5% Chebyshev(Mean, Sd) UCL	12.83
		99% Chebyshev(Mean, Sd) UCL	14.79

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.81		
95% Adjusted Gamma UCL	13.15		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	11.83
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	7
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Raw Statistics

Minimum	31.23	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.441
Mean	67.4	Maximum of Log Data	4.443
Median	67.4	Mean of log Data	4.163
SD	19.66	SD of log Data	0.341
Coefficient of Variation	0.292		
Skewness	-0.652		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.837	Shapiro Wilk Test Statistic	0.822
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	77.11	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	82.42
95% Adjusted-CLT UCL (Chen-1995)	75.31	95% Chebyshev (MVUE) UCL	96.01
95% Modified-t UCL (Johnson-1978)	76.95	97.5% Chebyshev (MVUE) UCL	108.2
		99% Chebyshev (MVUE) UCL	132.3

Gamma Distribution Test

k star (bias corrected)	8.174	Data Distribution	
Theta Star	8.246	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	67.4		
MLE of Standard Deviation	23.57		
nu star	212.5		
Approximate Chi Square Value (.05)	179.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	76.36
Adjusted Chi Square Value	175.5	95% Jackknife UCL	77.11
		95% Standard Bootstrap UCL	75.95
Anderson-Darling Test Statistic	0.925	95% Bootstrap-t UCL	76.43
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	75
Kolmogorov-Smirnov Test Statistic	0.273	95% Percentile Bootstrap UCL	75.93
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	74.96
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	91.16
		97.5% Chebyshev(Mean, Sd) UCL	101.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	121.6
95% Approximate Gamma UCL	79.67		
95% Adjusted Gamma UCL	81.62		

Potential UCL to Use

Use 95% Student's-t UCL	77.11
or 95% Modified-t UCL	76.95

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.06	Minimum of Log Data	-2.813
Maximum	13.91	Maximum of Log Data	2.633
Mean	9.452	Mean of log Data	1.926
Median		10 SD of log Data	1.427
SD	3.038		
Coefficient of Variation	0.321		
Skewness	-2.592		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.54	Shapiro Wilk Test Statistic	0.356
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.95	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	85.1
95% Adjusted-CLT UCL (Chen-1995)	10.19	95% Chebyshev (MVUE) UCL	48.45
95% Modified-t UCL (Johnson-1978)	10.85	97.5% Chebyshev (MVUE) UCL	62.22
		99% Chebyshev (MVUE) UCL	89.27

Gamma Distribution Test

k star (bias corrected)	1.365	Data Distribution	
Theta Star	6.924	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.452		
MLE of Standard Deviation	8.09		
nu star	35.49		
Approximate Chi Square Value (.05)	22.86	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.84
Adjusted Chi Square Value	21.43	95% Jackknife UCL	10.95
		95% Standard Bootstrap UCL	10.81
Anderson-Darling Test Statistic	4.009	95% Bootstrap-t UCL	10.44
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	10.33
Kolmogorov-Smirnov Test Statistic	0.525	95% Percentile Bootstrap UCL	10.56
Kolmogorov-Smirnov 5% Critical Value	0.24	95% BCA Bootstrap UCL	10.26
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.13
		97.5% Chebyshev(Mean, Sd) UCL	14.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.84
95% Approximate Gamma UCL	14.67		
95% Adjusted Gamma UCL	15.66		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	13.13
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	4.25	Minimum of Log Data	1.447
Maximum	33.64	Maximum of Log Data	3.516
Mean	19.81	Mean of log Data	2.915
Median		20 SD of log Data	0.464
SD	6.012		
Coefficient of Variation	0.304		
Skewness	-0.507		

Warning: There are only 4 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.58	Shapiro Wilk Test Statistic	0.48
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	22.78	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	27.12
95% Adjusted-CLT UCL (Chen-1995)	22.3	95% Chebyshev (MVUE) UCL	32.05
95% Modified-t UCL (Johnson-1978)	22.74	97.5% Chebyshev (MVUE) UCL	37.11
		99% Chebyshev (MVUE) UCL	47.04

Gamma Distribution Test

k star (bias corrected)	5.595	Data Distribution	
Theta Star	3.541	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	19.81		
MLE of Standard Deviation	8.375		
nu star	145.5		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301	Nonparametric Statistics	
Adjusted Chi Square Value	115.1	95% CLT UCL	22.55
		95% Jackknife UCL	22.78
		95% Standard Bootstrap UCL	22.54
Anderson-Darling Test Statistic	3.22	95% Bootstrap-t UCL	22.13
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	22.72
Kolmogorov-Smirnov Test Statistic	0.473	95% Percentile Bootstrap UCL	22.1
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	22.05
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27.08
		97.5% Chebyshev(Mean, Sd) UCL	30.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	36.4
95% Approximate Gamma UCL	24.3		
95% Adjusted Gamma UCL	25.03		

Potential UCL to Use

Use 95% Student's-t UCL	22.78
or 95% Modified-t UCL	22.74

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

13 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	7.2 Minimum of Log Data	1.974
Maximum	28.55 Maximum of Log Data	3.352
Mean	12.77 Mean of log Data	2.508
Median	12.77 SD of log Data	0.272
SD	4.417	
Coefficient of Variation	0.346	
Skewness	3.036	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.613 Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	14.64 95% H-UCL	14.44
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	16.4
95% Adjusted-CLT UCL (Chen-1995)	15.38 97.5% Chebyshev (MVUE) UCL	18
95% Modified-t UCL (Johnson-1978)	14.78 99% Chebyshev (MVUE) UCL	21.14

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	10.49 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.217	
MLE of Mean	12.77	
MLE of Standard Deviation	3.943	
nu star	356.8	

Approximate Chi Square Value (.05)

	314 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	14.54
Adjusted Chi Square Value	309.8 95% Jackknife UCL	14.64

Anderson-Darling Test Statistic

	95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic	1.844 95% Bootstrap-t UCL	16.36
Anderson-Darling 5% Critical Value	0.739 95% Hall's Bootstrap UCL	22.86
Kolmogorov-Smirnov Test Statistic	0.345 95% Percentile Bootstrap UCL	14.83
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	15.45
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	17.44
	97.5% Chebyshev(Mean, Sd) UCL	19.46
	99% Chebyshev(Mean, Sd) UCL	23.43

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.51
95% Adjusted Gamma UCL	14.71

Potential UCL to Use

Use 95% Student's-t UCL	14.64
or 95% Modified-t UCL	14.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	15.6	Minimum of Log Data	2.747
Maximum	85	Maximum of Log Data	4.443
Mean	61.31	Mean of log Data	4.042
Median	61.31	SD of log Data	0.44
SD	20.43		
Coefficient of Variation	0.333		
Skewness	-0.608		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Test Statistic	0.777
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	69.96	95% H-UCL	77.98
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	92.11
95% Adjusted-CLT UCL (Chen-1995)	68.68	97.5% Chebyshev (MVUE) UCL	105
95% Modified-t UCL (Johnson-1978)	69.84	99% Chebyshev (MVUE) UCL	130.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.765	Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.64		
MLE of Mean	61.31		
MLE of Standard Deviation	25.54		
nu star	196		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0346	Nonparametric Statistics	
Adjusted Chi Square Value	161.6	95% CLT UCL	69.46
		95% Jackknife UCL	69.96
		95% Standard Bootstrap UCL	69.18
Anderson-Darling Test Statistic	1.264	95% Bootstrap-t UCL	69.44
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	68.93
Kolmogorov-Smirnov Test Statistic	0.315	95% Percentile Bootstrap UCL	68.51
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	68.47
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	82.91
		97.5% Chebyshev(Mean, Sd) UCL	92.25
		99% Chebyshev(Mean, Sd) UCL	110.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	73
95% Adjusted Gamma UCL	74.36

Potential UCL to Use

Use 95% Student's-t UCL	69.96
or 95% Modified-t UCL	69.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	12.5	Minimum of Log Data	2.526
Maximum	66.58	Maximum of Log Data	4.198
Mean	58.82	Mean of log Data	4.027
Median	58.82	SD of log Data	0.39
SD	12.34		
Coefficient of Variation	0.21		
Skewness	-3.673		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.469	Shapiro Wilk Test Statistic	0.365
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	64.04	95% H-UCL	73.12
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	85.64
95% Adjusted-CLT UCL (Chen-1995)	60.89	97.5% Chebyshev (MVUE) UCL	96.63
95% Modified-t UCL (Johnson-1978)	63.6	99% Chebyshev (MVUE) UCL	118.2

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	8.918	Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.595		
MLE of Mean	58.82		
MLE of Standard Deviation	19.7		
nu star	303.2		
Approximate Chi Square Value (.05)	263.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	63.74
Adjusted Chi Square Value	260	95% Jackknife UCL	64.04
		95% Standard Bootstrap UCL	63.54
Anderson-Darling Test Statistic	4.232	95% Bootstrap-t UCL	62.36
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	61.85
Kolmogorov-Smirnov Test Statistic	0.482	95% Percentile Bootstrap UCL	62.55
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	61.91
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	71.87
		97.5% Chebyshev(Mean, Sd) UCL	77.51
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	88.6
95% Approximate Gamma UCL	67.59		
95% Adjusted Gamma UCL	68.58		

Potential UCL to Use

Use 95% Student's-t UCL 64.04
or 95% Modified-t UCL 63.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.037	Minimum of Log Data	-3.297
Maximum	0.041	Maximum of Log Data	-3.194
Mean	0.039	Mean of log Data	-3.244
Median	0.039	SD of log Data	0.0182
SD	7.07E-04		
Coefficient of Variation	0.0181		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.494	Shapiro Wilk Test Statistic	0.493
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0393	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.0393	95% Chebyshev (MVUE) UCL	0.0397
95% Modified-t UCL (Johnson-1978)	0.0393	97.5% Chebyshev (MVUE) UCL	0.0401
		99% Chebyshev (MVUE) UCL	0.0407

Gamma Distribution Test

k star (bias corrected)	2658	Data Distribution	
Theta Star	1.47E-05	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.039		
MLE of Standard Deviation	7.56E-04		
nu star	90386		
Approximate Chi Square Value (.05)	89688	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	0.0393
Adjusted Chi Square Value	89615	95% Jackknife UCL	0.0393
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.627	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.478	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0397
		97.5% Chebyshev(Mean, Sd) UCL	0.0401
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0407
95% Approximate Gamma UCL	0.0393		
95% Adjusted Gamma UCL	0.0393		

Potential UCL to Use Use 95% Student's-t UCL 0.0393
 or 95% Modified-t UCL 0.0393

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	1.25 Minimum of Log Data	0.223
Maximum	1.31 Maximum of Log Data	0.27
Mean	1.28 Mean of log Data	0.247
Median	1.28 SD of log Data	0.00829
SD	0.0106	
Coefficient of Variation	0.00829	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.494 Shapiro Wilk Test Statistic	0.494
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.284 95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.291
95% Adjusted-CLT UCL (Chen-1995)	1.284 97.5% Chebyshev (MVUE) UCL	1.296
95% Modified-t UCL (Johnson-1978)	1.284 99% Chebyshev (MVUE) UCL	1.306

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	12740	Data do not follow a Discernable Distribution (0.05)
Theta Star	1.00E-04	
MLE of Mean	1.28	
MLE of Standard Deviation	0.0113	
nu star	433153	
Approximate Chi Square Value (.05)	431623	Nonparametric Statistics
Adjusted Level of Significance	0.0346	95% CLT UCL 1.284
Adjusted Chi Square Value	431463	95% Jackknife UCL 1.284
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	7.41	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.65	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.291
		97.5% Chebyshev(Mean, Sd) UCL 1.296
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 1.306
95% Approximate Gamma UCL	1.285	
95% Adjusted Gamma UCL	1.285	

Potential UCL to Use Use 95% Student's-t UCL 1.284
 or 95% Modified-t UCL 1.284

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	5
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Raw Statistics

Minimum	9.3	Minimum of Log Data	2.23
Maximum	85	Maximum of Log Data	4.443
Mean	75.9	Mean of log Data	4.248
Median	85	SD of log Data	0.514
SD	21.23		
Coefficient of Variation	0.28		
Skewness	-2.232		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.495	Shapiro Wilk Test Statistic	0.449
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	83.5	95% H-UCL	99.28
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	118
95% Adjusted-CLT UCL (Chen-1995)	80.98	97.5% Chebyshev (MVUE) UCL	134.7
95% Modified-t UCL (Johnson-1978)	83.15	99% Chebyshev (MVUE) UCL	167.5

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	5.498	Data Distribution	
Theta Star	13.8	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	75.9		
MLE of Standard Deviation	32.37		
nu star	252.9		
Approximate Chi Square Value (.05)	217.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	83.18
Adjusted Chi Square Value	214.7	95% Jackknife UCL	83.5
		95% Standard Bootstrap UCL	82.88
Anderson-Darling Test Statistic	5.695	95% Bootstrap-t UCL	81.63
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	81.43
Kolmogorov-Smirnov Test Statistic	0.489	95% Percentile Bootstrap UCL	81.82
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	81.11
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	95.19
		97.5% Chebyshev(Mean, Sd) UCL	103.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	119.9
95% Approximate Gamma UCL	88.42		
95% Adjusted Gamma UCL	89.41		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 95.19

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.0248 Minimum of Log Data	-3.697
Maximum	10 Maximum of Log Data	2.303
Mean	9.519 Mean of log Data	2.037
Median	10 SD of log Data	1.25
SD	2.082	
Coefficient of Variation	0.219	
Skewness	-4.71	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.249 Shapiro Wilk Test Statistic	0.222
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.26 95% H-UCL	36.02
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	37.04
95% Adjusted-CLT UCL (Chen-1995)	9.778 97.5% Chebyshev (MVUE) UCL	46.22
95% Modified-t UCL (Johnson-1978)	10.19 99% Chebyshev (MVUE) UCL	64.24

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.17 Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.386	
MLE of Mean	9.519	
MLE of Standard Deviation	6.461	
nu star	99.84	
Approximate Chi Square Value (.05)	77.79 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	10.23
Adjusted Chi Square Value	76.38 95% Jackknife UCL	10.26
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	8.537 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.753 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.528 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.183 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11.41
	97.5% Chebyshev(Mean, Sd) UCL	12.23
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	13.84
95% Approximate Gamma UCL	12.22	
95% Adjusted Gamma UCL	12.44	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.41
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	55.68 Minimum of Log Data	4.02
Maximum	91.72 Maximum of Log Data	4.519
Mean	66.54 Mean of log Data	4.193
Median	65 SD of log Data	0.0962
SD	7.052	
Coefficient of Variation	0.106	
Skewness	2.493	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.575 Shapiro Wilk Test Statistic	0.609
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	69.06 95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	72.35
95% Adjusted-CLT UCL (Chen-1995)	69.77 97.5% Chebyshev (MVUE) UCL	74.87
95% Modified-t UCL (Johnson-1978)	69.19 99% Chebyshev (MVUE) UCL	79.82

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	92.44 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.72	
MLE of Mean	66.54	
MLE of Standard Deviation	6.92	
nu star	4252	
Approximate Chi Square Value (.05)	4102 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	68.96
Adjusted Chi Square Value	4091 95% Jackknife UCL	69.06
	95% Standard Bootstrap UCL	68.87
Anderson-Darling Test Statistic	4.596 95% Bootstrap-t UCL	71.68
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	83.84
Kolmogorov-Smirnov Test Statistic	0.452 95% Percentile Bootstrap UCL	69.19
Kolmogorov-Smirnov 5% Critical Value	0.181 95% BCA Bootstrap UCL	69.7
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	72.95
	97.5% Chebyshev(Mean, Sd) UCL	75.72
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	81.17
95% Approximate Gamma UCL	68.98	
95% Adjusted Gamma UCL	69.16	

Potential UCL to Use Use 95% Student's-t UCL 69.06
or 95% Modified-t UCL 69.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 6

Raw Statistics

Minimum	0.039	Log-transformed Statistics	
Maximum	12.35	Minimum of Log Data	-3.244
Mean	9.775	Maximum of Log Data	2.514
Median		Mean of log Data	2.081
SD	2.204	10 SD of log Data	1.162
Coefficient of Variation	0.225		
Skewness	-4.178		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.372	Shapiro Wilk Test Statistic	0.242
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.56	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	31.06
95% Adjusted-CLT UCL (Chen-1995)	10.1	95% Chebyshev (MVUE) UCL	33.47
95% Modified-t UCL (Johnson-1978)	10.5	97.5% Chebyshev (MVUE) UCL	41.44
		99% Chebyshev (MVUE) UCL	57.11

Gamma Distribution Test

k star (bias corrected)	2.345	Data Distribution	
Theta Star	4.168	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.775		
MLE of Standard Deviation	6.383		
nu star	107.9		
Approximate Chi Square Value (.05)	84.91	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	10.53
Adjusted Chi Square Value	83.44	95% Jackknife UCL	10.56
		95% Standard Bootstrap UCL	10.51
Anderson-Darling Test Statistic	7.82	95% Bootstrap-t UCL	10.31
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	10.23
Kolmogorov-Smirnov Test Statistic	0.552	95% Percentile Bootstrap UCL	10.35
Kolmogorov-Smirnov 5% Critical Value	0.183	95% BCA Bootstrap UCL	10.28
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.78
		97.5% Chebyshev(Mean, Sd) UCL	12.64
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.35
95% Approximate Gamma UCL	12.42		
95% Adjusted Gamma UCL	12.64		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

23 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations

23 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-05.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	7
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	8.8	Minimum of Log Data	2.175
Maximum	85	Maximum of Log Data	4.443
Mean	70.05	Mean of log Data	4.143
Median	85	SD of log Data	0.57
SD	24.42		
Coefficient of Variation	0.349		
Skewness	-1.281		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.649	Shapiro Wilk Test Statistic	0.595
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	79.5	95% H-UCL	97.36
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	116.1
95% Adjusted-CLT UCL (Chen-1995)	77.36	97.5% Chebyshev (MVUE) UCL	134.5
95% Modified-t UCL (Johnson-1978)	79.23	99% Chebyshev (MVUE) UCL	170.8

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	4.153	Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.87		
MLE of Mean	70.05		
MLE of Standard Deviation	34.38		
nu star	166.1		
Approximate Chi Square Value (.05)	137.3	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	79.04
Adjusted Chi Square Value	135.2	95% Jackknife UCL	79.5
		95% Standard Bootstrap UCL	78.81
Anderson-Darling Test Statistic	3.337	95% Bootstrap-t UCL	78.12
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	77.27
Kolmogorov-Smirnov Test Statistic	0.422	95% Percentile Bootstrap UCL	78.33
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	77.27
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	93.85
		97.5% Chebyshev(Mean, Sd) UCL	104.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	124.4
95% Approximate Gamma UCL	84.75		
95% Adjusted Gamma UCL	86.04		

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	93.85
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 3

Raw Statistics

Minimum	0.0271	Log-transformed Statistics	
Maximum	9.436	Minimum of Log Data	-3.608
Mean	2.234	10 Maximum of Log Data	2.303
Median	0.237	Mean of log Data	2
SD	-4.355	10 SD of log Data	1.32
Coefficient of Variation			
Skewness			

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.279	Shapiro Wilk Test Statistic	0.244
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	45.56
95% Adjusted-CLT UCL (Chen-1995)	9.738	95% Chebyshev (MVUE) UCL	41.17
95% Modified-t UCL (Johnson-1978)	10.22	97.5% Chebyshev (MVUE) UCL	51.87
		99% Chebyshev (MVUE) UCL	72.91

Gamma Distribution Test

k star (bias corrected)	1.901	Data Distribution	
Theta Star	4.964	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.436		
MLE of Standard Deviation	6.844		
nu star	76.04		
Approximate Chi Square Value (.05)	56.95	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	10.26
Adjusted Chi Square Value	55.65	95% Jackknife UCL	10.3
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	7.311	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.523	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.196	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.61
		97.5% Chebyshev(Mean, Sd) UCL	12.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.41
95% Approximate Gamma UCL	12.6		
95% Adjusted Gamma UCL	12.89		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.61

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 4

Raw Statistics

Minimum	6.4	Minimum of Log Data	1.856
Maximum	75.64	Maximum of Log Data	4.326
Mean	62.34	Mean of log Data	4.062
Median	65	SD of log Data	0.521
SD	13.44		
Coefficient of Variation	0.216		
Skewness	-4.152		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.346	Shapiro Wilk Test Statistic	0.278
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.54	95% H-UCL	84.86
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	100.8
95% Adjusted-CLT UCL (Chen-1995)	64.31	97.5% Chebyshev (MVUE) UCL	115.9
95% Modified-t UCL (Johnson-1978)	67.08	99% Chebyshev (MVUE) UCL	145.5

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	6.179	Data Distribution	
Theta Star	10.09	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	62.34		
MLE of Standard Deviation	25.08		
nu star	247.2		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.038	Nonparametric Statistics	
Adjusted Chi Square Value	209.2	95% CLT UCL	67.29
		95% Jackknife UCL	67.54
		95% Standard Bootstrap UCL	67.21

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	6.49	95% Bootstrap-t UCL	66.14
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	65.58
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	66.06
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	65.53
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	75.44
		97.5% Chebyshev(Mean, Sd) UCL	81.11
		99% Chebyshev(Mean, Sd) UCL	92.25

Assuming Gamma Distribution

95% Approximate Gamma UCL	72.76
95% Adjusted Gamma UCL	73.66

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	75.44
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.048	Minimum of Log Data	-3.037
Maximum	15.49	Maximum of Log Data	2.74
Mean	9.884	Mean of log Data	2.068
Median		10 SD of log Data	1.206
SD	2.632		
Coefficient of Variation	0.266		
Skewness	-2.472		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.481	Shapiro Wilk Test Statistic	0.283
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.9	95% H-UCL	36.92
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	36.37
95% Adjusted-CLT UCL (Chen-1995)	10.5	97.5% Chebyshev (MVUE) UCL	45.43
95% Modified-t UCL (Johnson-1978)	10.85	99% Chebyshev (MVUE) UCL	63.22

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.067	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.782		
MLE of Mean	9.884		
MLE of Standard Deviation	6.875		
nu star	82.67		
Approximate Chi Square Value (.05)	62.72	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	10.85
Adjusted Chi Square Value	61.35	95% Jackknife UCL	10.9
		95% Standard Bootstrap UCL	10.81
Anderson-Darling Test Statistic	6.332	95% Bootstrap-t UCL	10.62
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	10.6
Kolmogorov-Smirnov Test Statistic	0.543	95% Percentile Bootstrap UCL	10.73
Kolmogorov-Smirnov 5% Critical Value	0.196	95% BCA Bootstrap UCL	10.55
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.45
		97.5% Chebyshev(Mean, Sd) UCL	13.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.74
95% Approximate Gamma UCL	13.03		
95% Adjusted Gamma UCL	13.32		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.45

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

20 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations

20 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-06.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	14 Minimum of Log Data	2.639
Maximum	85 Maximum of Log Data	4.443
Mean	70.13 Mean of log Data	4.159
Median	77.56 SD of log Data	0.533
SD	22.51	
Coefficient of Variation	0.321	
Skewness	-1.849	

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.701 Shapiro Wilk Test Statistic	0.594
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	81.8	Assuming Lognormal Distribution	95% H-UCL	104.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		123
95% Adjusted-CLT UCL (Chen-1995)	77.11	97.5% Chebyshev (MVUE) UCL		144.7
95% Modified-t UCL (Johnson-1978)	81.22	99% Chebyshev (MVUE) UCL		187.3

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	4.282 Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.38	
MLE of Mean	70.13	
MLE of Standard Deviation	33.89	
nu star	102.8	
Approximate Chi Square Value (.05)	80.37 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	80.82
Adjusted Chi Square Value	77.35 95% Jackknife UCL	81.8
	95% Standard Bootstrap UCL	80.61
Anderson-Darling Test Statistic	1.932 95% Bootstrap-t UCL	78.97
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	77.88
Kolmogorov-Smirnov Test Statistic	0.389 95% Percentile Bootstrap UCL	79.76
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	77.56
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	98.45
	97.5% Chebyshev(Mean, Sd) UCL	110.7
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	134.8
95% Approximate Gamma UCL		89.66
95% Adjusted Gamma UCL		93.16

Potential UCL to Use

	Use 95% Chebyshev (Mean, Sd) UCL	98.45
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	118.8	Minimum of Log Data	4.778
Maximum	2807	Maximum of Log Data	7.94
Mean	658.1	Mean of log Data	6.127
Median	530.4	SD of log Data	0.854
SD	719.1		
Coefficient of Variation	1.093		
Skewness	2.783		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.642	Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1031	95% H-UCL	1308
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1355
95% Adjusted-CLT UCL (Chen-1995)	1178	97.5% Chebyshev (MVUE) UCL	1667
95% Modified-t UCL (Johnson-1978)	1059	99% Chebyshev (MVUE) UCL	2279

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.199	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	548.8		
MLE of Mean	658.1		
MLE of Standard Deviation	601		
nu star	28.78		
Approximate Chi Square Value (.05)	17.54	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	999.5
Adjusted Chi Square Value	16.21	95% Jackknife UCL	1031
		95% Standard Bootstrap UCL	981.3
Anderson-Darling Test Statistic	0.564	95% Bootstrap-t UCL	1533
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	2409
Kolmogorov-Smirnov Test Statistic	0.226	95% Percentile Bootstrap UCL	1007
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	1259
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1563
		97.5% Chebyshev(Mean, Sd) UCL	1954
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2723
95% Approximate Gamma UCL	1080		
95% Adjusted Gamma UCL	1168		

Potential UCL to Use Use 95% Approximate Gamma UCL 1080

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	10.1	Minimum of Log Data	2.313
Maximum	80.6	Maximum of Log Data	4.389
Mean	61.63	Mean of log Data	4.034
Median	65	SD of log Data	0.549
SD	17.37		
Coefficient of Variation	0.282		
Skewness	-2.622		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.623	Shapiro Wilk Test Statistic	0.462
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.63	95% H-UCL	94.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	110.8
95% Adjusted-CLT UCL (Chen-1995)	65.82	97.5% Chebyshev (MVUE) UCL	130.7
95% Modified-t UCL (Johnson-1978)	70	99% Chebyshev (MVUE) UCL	169.8

Gamma Distribution Test

k star (bias corrected)	4.475	Data Distribution	
Theta Star	13.77	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.63		
MLE of Standard Deviation	29.13		
nu star	107.4		
Approximate Chi Square Value (.05)	84.48	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	69.88
Adjusted Chi Square Value	81.38	95% Jackknife UCL	70.63
		95% Standard Bootstrap UCL	69.64
Anderson-Darling Test Statistic	2.688	95% Bootstrap-t UCL	67.91
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	67.01
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	68.07
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	67.23
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	83.49
		97.5% Chebyshev(Mean, Sd) UCL	92.94
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	111.5
95% Approximate Gamma UCL	78.35		
95% Adjusted Gamma UCL	81.33		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 83.49
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.035	Minimum of Log Data	-3.352
Maximum	10	Maximum of Log Data	2.303
Mean	8.741	Mean of log Data	1.786
Median	9.945	SD of log Data	1.619
SD	2.806		
Coefficient of Variation	0.321		
Skewness	-3.19		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.486	Shapiro Wilk Test Statistic	0.356
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	167.4
95% Adjusted-CLT UCL (Chen-1995)	9.276	95% Chebyshev (MVUE) UCL	58.46
95% Modified-t UCL (Johnson-1978)	10.07	97.5% Chebyshev (MVUE) UCL	75.94
		99% Chebyshev (MVUE) UCL	110.3

Gamma Distribution Test

k star (bias corrected)	1.144	Data Distribution	
Theta Star	7.639	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.741		
MLE of Standard Deviation	8.171		
nu star	27.46		
Approximate Chi Square Value (.05)	16.51	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.07
Adjusted Chi Square Value	15.23	95% Jackknife UCL	10.2
		95% Standard Bootstrap UCL	10.03
Anderson-Darling Test Statistic	3.771	95% Bootstrap-t UCL	9.666
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	9.523
Kolmogorov-Smirnov Test Statistic	0.527	95% Percentile Bootstrap UCL	9.685
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	9.571
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.27
		97.5% Chebyshev(Mean, Sd) UCL	13.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.8
95% Approximate Gamma UCL	14.54		
95% Adjusted Gamma UCL	15.76		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 16.8
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-07.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	11.4	Minimum of Log Data	2.434
Maximum	85	Maximum of Log Data	4.443
Mean	68.17	Mean of log Data	4.126
Median	85	SD of log Data	0.535
SD	23.29		
Coefficient of Variation	0.342		
Skewness	-1.213		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.758	Shapiro Wilk Test Statistic	0.66
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	78.37	95% H-UCL	95.35
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	113.5
95% Adjusted-CLT UCL (Chen-1995)	75.86	97.5% Chebyshev (MVUE) UCL	132
95% Modified-t UCL (Johnson-1978)	78.08	99% Chebyshev (MVUE) UCL	168.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.398	Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.5		
MLE of Mean	68.17		
MLE of Standard Deviation	32.5		
nu star	140.7		
Approximate Chi Square Value (.05)	114.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	77.74
Adjusted Chi Square Value	111.6	95% Jackknife UCL	78.37
		95% Standard Bootstrap UCL	77.34
Anderson-Darling Test Statistic	1.853	95% Bootstrap-t UCL	77.31
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	76.11
Kolmogorov-Smirnov Test Statistic	0.312	95% Percentile Bootstrap UCL	76.86
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	76.41
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	93.54
		97.5% Chebyshev(Mean, Sd) UCL	104.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	126.1
95% Approximate Gamma UCL	83.91		
95% Adjusted Gamma UCL	85.95		

Potential UCL to Use

		Use 95% Chebyshev (Mean, Sd) UCL	93.54
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	7.9 Minimum of Log Data	2.067
Maximum	77.14 Maximum of Log Data	4.346
Mean	61.79 Mean of log Data	4.047
Median	65 SD of log Data	0.53
SD	14.75	
Coefficient of Variation	0.239	
Skewness	-3.62	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.417 Shapiro Wilk Test Statistic	0.331
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.25	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	87.58
95% Adjusted-CLT UCL (Chen-1995)	64.29	95% Chebyshev (MVUE) UCL	104.2
95% Modified-t UCL (Johnson-1978)	67.7	97.5% Chebyshev (MVUE) UCL	121.1
		99% Chebyshev (MVUE) UCL	154.3

Gamma Distribution Test

k star (bias corrected)	5.471	Data Distribution	
Theta Star	11.29	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.79		
MLE of Standard Deviation	26.42		
nu star	175.1		
Approximate Chi Square Value (.05)	145.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	67.85
Adjusted Chi Square Value	142.4	95% Jackknife UCL	68.25
		95% Standard Bootstrap UCL	67.76
Anderson-Darling Test Statistic	4.847	95% Bootstrap-t UCL	66.28
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	65.53
Kolmogorov-Smirnov Test Statistic	0.489	95% Percentile Bootstrap UCL	66.32
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	65.71
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	77.86
		97.5% Chebyshev(Mean, Sd) UCL	84.82
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	98.48
95% Approximate Gamma UCL	74.36		
95% Adjusted Gamma UCL	75.96		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 77.86

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics

Minimum	0.034	Log-transformed Statistics	
Maximum	13.53	Minimum of Log Data	-3.381
Mean	9.564	Maximum of Log Data	2.605
Median		Mean of log Data	1.963
SD	2.698	10 SD of log Data	1.427
Coefficient of Variation	0.282		
Skewness	-3.109		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.473	Shapiro Wilk Test Statistic	0.307
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.75	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.37
95% Adjusted-CLT UCL (Chen-1995)	10.11	95% Chebyshev (MVUE) UCL	49.13
95% Modified-t UCL (Johnson-1978)	10.66	97.5% Chebyshev (MVUE) UCL	62.76
		99% Chebyshev (MVUE) UCL	89.52

Gamma Distribution Test

k star (bias corrected)	1.539	Data Distribution	
Theta Star	6.216	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.564		
MLE of Standard Deviation	7.71		
nu star	49.23		
Approximate Chi Square Value (.05)	34.13	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	10.67
Adjusted Chi Square Value	32.7	95% Jackknife UCL	10.75
		95% Standard Bootstrap UCL	10.68
Anderson-Darling Test Statistic	5.236	95% Bootstrap-t UCL	10.4
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	10.27
Kolmogorov-Smirnov Test Statistic	0.535	95% Percentile Bootstrap UCL	10.44
Kolmogorov-Smirnov 5% Critical Value	0.218	95% BCA Bootstrap UCL	10.27
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.5
		97.5% Chebyshev(Mean, Sd) UCL	13.78
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.28
95% Approximate Gamma UCL	13.8		
95% Adjusted Gamma UCL	14.4		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-08.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	11	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.398
Mean	55.83	Maximum of Log Data	4.443
Median	54.71	Mean of log Data	3.922
SD	21.31	SD of log Data	0.541
Coefficient of Variation	0.382		
Skewness	-0.231		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.874	Shapiro Wilk Test Statistic	0.736
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.88	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	83.58
95% Adjusted-CLT UCL (Chen-1995)	65.51	95% Chebyshev (MVUE) UCL	97.98
95% Modified-t UCL (Johnson-1978)	66.81	97.5% Chebyshev (MVUE) UCL	115.4
		99% Chebyshev (MVUE) UCL	149.7

Gamma Distribution Test

k star (bias corrected)	3.9	Data Distribution	
Theta Star	14.32	Data appear Normal at 5% Significance Level	
MLE of Mean	55.83		
MLE of Standard Deviation	28.27		
nu star	93.61		
Approximate Chi Square Value (.05)	72.29	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	65.95
Adjusted Chi Square Value	69.44	95% Jackknife UCL	66.88
		95% Standard Bootstrap UCL	65.19
Anderson-Darling Test Statistic	0.922	95% Bootstrap-t UCL	67.11
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	66.61
Kolmogorov-Smirnov Test Statistic	0.239	95% Percentile Bootstrap UCL	65.46
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	65.76
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	82.65
		97.5% Chebyshev(Mean, Sd) UCL	94.25
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117
95% Approximate Gamma UCL	72.29		
95% Adjusted Gamma UCL	75.27		

Potential UCL to Use	Use 95% Student's-t UCL	66.88
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

Minimum	112.7	Log-transformed Statistics	
Maximum	1823	Minimum of Log Data	4.725
Mean	545.5	Maximum of Log Data	7.508
Median	486.8	Mean of log Data	6.084
SD	434.5	SD of log Data	0.683
Coefficient of Variation	0.797		
Skewness	2.572		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.695	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	770.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	907.2
95% Adjusted-CLT UCL (Chen-1995)	851.4	95% Chebyshev (MVUE) UCL	1027
95% Modified-t UCL (Johnson-1978)	786.3	97.5% Chebyshev (MVUE) UCL	1237
		99% Chebyshev (MVUE) UCL	1649

Gamma Distribution Test

k star (bias corrected)	1.897	Data Distribution	
Theta Star	287.6	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	545.5		
MLE of Standard Deviation	396.1		
nu star	45.52		
Approximate Chi Square Value (.05)	31.05	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	751.8
Adjusted Chi Square Value	29.23	95% Jackknife UCL	770.8
		95% Standard Bootstrap UCL	737.6
Anderson-Darling Test Statistic	0.597	95% Bootstrap-t UCL	978.7
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	1669
Kolmogorov-Smirnov Test Statistic	0.245	95% Percentile Bootstrap UCL	772.6
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	889
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1092
		97.5% Chebyshev(Mean, Sd) UCL	1329
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1794
95% Approximate Gamma UCL	799.9		
95% Adjusted Gamma UCL	849.6		

Potential UCL to Use Use 95% Approximate Gamma UCL 799.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-09.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	6
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.75	Minimum of Log Data	1.749
Maximum	14	Maximum of Log Data	2.639
Mean	10.4	Mean of log Data	2.32
Median	11	SD of log Data	0.232
SD	2.062		
Coefficient of Variation	0.198		
Skewness	-1.112		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.778	Shapiro Wilk Test Statistic	0.72
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.42	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.83
95% Adjusted-CLT UCL (Chen-1995)	11.15	95% Chebyshev (MVUE) UCL	13.37
95% Modified-t UCL (Johnson-1978)	11.39	97.5% Chebyshev (MVUE) UCL	14.64
		99% Chebyshev (MVUE) UCL	17.14

Gamma Distribution Test

k star (bias corrected)	17.49	Data Distribution	
Theta Star	0.595	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.4		
MLE of Standard Deviation	2.488		
nu star	454.6		
Approximate Chi Square Value (.05)	406.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	11.34
Adjusted Chi Square Value	399.7	95% Jackknife UCL	11.42
		95% Standard Bootstrap UCL	11.31
Anderson-Darling Test Statistic	1.8	95% Bootstrap-t UCL	11.26
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	11.21
Kolmogorov-Smirnov Test Statistic	0.374	95% Percentile Bootstrap UCL	11.27
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	11.13
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.9
		97.5% Chebyshev(Mean, Sd) UCL	13.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.09
95% Approximate Gamma UCL	11.64		
95% Adjusted Gamma UCL	11.83		

Potential UCL to Use

Use 95% Student's-t UCL	11.42
or 95% Modified-t UCL	11.39

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 7

Raw Statistics

Minimum	35.65	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.574
Mean	64.78	Maximum of Log Data	4.443
Median	64.78	Mean of log Data	4.129
SD	18.78	SD of log Data	0.31
Coefficient of Variation	0.29		
Skewness	-0.135		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	74.07	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	77.35
95% Adjusted-CLT UCL (Chen-1995)	73.14	95% Chebyshev (MVUE) UCL	89.48
95% Modified-t UCL (Johnson-1978)	74.03	97.5% Chebyshev (MVUE) UCL	100.1
		99% Chebyshev (MVUE) UCL	121

Gamma Distribution Test

k star (bias corrected)	9.257	Data Distribution	
Theta Star	6.998	Data appear Lognormal at 5% Significance Level	
MLE of Mean	64.78		
MLE of Standard Deviation	21.29		
nu star	240.7		
Approximate Chi Square Value (.05)	205.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	73.35
Adjusted Chi Square Value	201.2	95% Jackknife UCL	74.07
		95% Standard Bootstrap UCL	73.06
Anderson-Darling Test Statistic	0.764	95% Bootstrap-t UCL	73.29
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	73.03
Kolmogorov-Smirnov Test Statistic	0.244	95% Percentile Bootstrap UCL	72.84
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	72.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.49
		97.5% Chebyshev(Mean, Sd) UCL	97.31
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	116.6
95% Approximate Gamma UCL	75.77		
95% Adjusted Gamma UCL	77.51		

Potential UCL to Use

Use 95% Student's-t UCL	74.07
or 95% Modified-t UCL	74.03
or 95% H-UCL	77.35

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-10.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	4.6	Minimum of Log Data	1.526
Maximum	14.08	Maximum of Log Data	2.645
Mean	10.96	Mean of log Data	2.365
Median	11	SD of log Data	0.28
SD	2.322		
Coefficient of Variation	0.212		
Skewness	-1.733		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.651	Shapiro Wilk Test Statistic	0.559
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	12.16	95% H-UCL	13
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.95
95% Adjusted-CLT UCL (Chen-1995)	11.7	97.5% Chebyshev (MVUE) UCL	16.65
95% Modified-t UCL (Johnson-1978)	12.11	99% Chebyshev (MVUE) UCL	19.98

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	12.88	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.851		
MLE of Mean	10.96		
MLE of Standard Deviation	3.053		
nu star	309.1		
Approximate Chi Square Value (.05)	269.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12.06
Adjusted Chi Square Value	263.8	95% Jackknife UCL	12.16
		95% Standard Bootstrap UCL	12
Anderson-Darling Test Statistic	2.334	95% Bootstrap-t UCL	11.93
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11.84
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	11.99
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.74
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.88
		97.5% Chebyshev(Mean, Sd) UCL	15.14
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.63
95% Approximate Gamma UCL	12.57		
95% Adjusted Gamma UCL	12.84		

Potential UCL to Use

Use 95% Student's-t UCL	12.16
or 95% Modified-t UCL	12.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cesium-137 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	15.6 Minimum of Log Data	2.747
Maximum	85 Maximum of Log Data	4.443
Mean	70.24 Mean of log Data	4.167
Median	77.62 SD of log Data	0.507
SD	22.25	
Coefficient of Variation	0.317	
Skewness	-1.812	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.702 Shapiro Wilk Test Statistic	0.606
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	81.77	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	101.9
95% Adjusted-CLT UCL (Chen-1995)	77.21	95% Chebyshev (MVUE) UCL	119.9
95% Modified-t UCL (Johnson-1978)	81.21	97.5% Chebyshev (MVUE) UCL	140.5
		99% Chebyshev (MVUE) UCL	180.8

Gamma Distribution Test

k star (bias corrected)	4.588	Data Distribution	
Theta Star	15.31	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	70.24		
MLE of Standard Deviation	32.79		
nu star	110.1		
Approximate Chi Square Value (.05)	86.89	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	80.8
Adjusted Chi Square Value	83.74	95% Jackknife UCL	81.77
		95% Standard Bootstrap UCL	80.14
Anderson-Darling Test Statistic	1.911	95% Bootstrap-t UCL	79.05
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	78.35
Kolmogorov-Smirnov Test Statistic	0.387	95% Percentile Bootstrap UCL	80.08
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	77.25
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	98.23
		97.5% Chebyshev(Mean, Sd) UCL	110.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	134.1
95% Approximate Gamma UCL	89.01		
95% Adjusted Gamma UCL	92.35		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 98.23

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	9.4 Minimum of Log Data	2.241
Maximum	75.99 Maximum of Log Data	4.331
Mean	59.88 Mean of log Data	4.003
Median	65 SD of log Data	0.559
SD	16.56	
Coefficient of Variation	0.277	
Skewness	-2.958	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.581 Shapiro Wilk Test Statistic	0.439
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	68.46 95% H-UCL	93.12
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	108.9
95% Adjusted-CLT UCL (Chen-1995)	63.38 97.5% Chebyshev (MVUE) UCL	128.7
95% Modified-t UCL (Johnson-1978)	67.78 99% Chebyshev (MVUE) UCL	167.5

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.396 Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.62	
MLE of Mean	59.88	
MLE of Standard Deviation	28.56	
nu star	105.5	
Approximate Chi Square Value (.05)	82.81 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	67.74
Adjusted Chi Square Value	79.74 95% Jackknife UCL	68.46
	95% Standard Bootstrap UCL	67.5
Anderson-Darling Test Statistic	2.865 95% Bootstrap-t UCL	65.68
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	64.75
Kolmogorov-Smirnov Test Statistic	0.472 95% Percentile Bootstrap UCL	65.98
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	65
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	80.71
	97.5% Chebyshev(Mean, Sd) UCL	89.73
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	107.4
95% Approximate Gamma UCL	76.3	
95% Adjusted Gamma UCL	79.23	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 80.71

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-11.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	11.6	Minimum of Log Data	2.451
Maximum	85	Maximum of Log Data	4.443
Mean	66.77	Mean of log Data	4.065
Median	85	SD of log Data	0.639
SD	26.98		
Coefficient of Variation	0.404		
Skewness	-1.231		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.719	Shapiro Wilk Test Statistic	0.674
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	80.75	95% H-UCL	111.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	128.5
95% Adjusted-CLT UCL (Chen-1995)	76.62	97.5% Chebyshev (MVUE) UCL	153.8
95% Modified-t UCL (Johnson-1978)	80.29	99% Chebyshev (MVUE) UCL	203.4

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.936	Data do not follow a Discernable Distribution (0.05)	
Theta Star	22.74		
MLE of Mean	66.77		
MLE of Standard Deviation	38.97		
nu star	70.46		
Approximate Chi Square Value (.05)	52.13	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	79.58
Adjusted Chi Square Value	49.74	95% Jackknife UCL	80.75
		95% Standard Bootstrap UCL	79.37
Anderson-Darling Test Statistic	1.74	95% Bootstrap-t UCL	78.35
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	76.46
Kolmogorov-Smirnov Test Statistic	0.329	95% Percentile Bootstrap UCL	77.6
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	76.08
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	100.7
		97.5% Chebyshev(Mean, Sd) UCL	115.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	144.3
95% Approximate Gamma UCL	90.23		
95% Adjusted Gamma UCL	94.59		

Potential UCL to Use

		Use 95% Chebyshev (Mean, Sd) UCL	100.7
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.0408	Minimum of Log Data -3.199
Maximum	10	Maximum of Log Data 2.303
Mean	8.813	Mean of log Data 1.805
Median	10	SD of log Data 1.578
SD	2.84	
Coefficient of Variation	0.322	
Skewness	-3.152	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.484	Shapiro Wilk Test Statistic 0.358
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.29	95% H-UCL 145.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 55.58
95% Adjusted-CLT UCL (Chen-1995)	9.365	97.5% Chebyshev (MVUE) UCL 72.05
95% Modified-t UCL (Johnson-1978)	10.16	99% Chebyshev (MVUE) UCL 104.4

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.175	Data do not follow a Discernable Distribution (0.05)
Theta Star	7.498	
MLE of Mean	8.813	
MLE of Standard Deviation	8.129	
nu star	28.21	
Approximate Chi Square Value (.05)	17.09	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 10.16
Adjusted Chi Square Value	15.78	95% Jackknife UCL 10.29
		95% Standard Bootstrap UCL 10.06
Anderson-Darling Test Statistic	3.753	95% Bootstrap-t UCL 9.748
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL 9.66
Kolmogorov-Smirnov Test Statistic	0.486	95% Percentile Bootstrap UCL 9.802
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL 9.643
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 12.39
		97.5% Chebyshev(Mean, Sd) UCL 13.93
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 16.97
95% Approximate Gamma UCL	14.55	
95% Adjusted Gamma UCL	15.75	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 16.97
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	9 Minimum of Log Data	2.197
Maximum	100.7 Maximum of Log Data	4.612
Mean	72.37 Mean of log Data	4.166
Median	72.37 SD of log Data	0.641
SD	23.97	
Coefficient of Variation	0.331	
Skewness	-1.618	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.824 Shapiro Wilk Test Statistic	0.567
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	84.8 95% H-UCL	124.2
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	142.5
95% Adjusted-CLT UCL (Chen-1995)	80.3 97.5% Chebyshev (MVUE) UCL	170.6
95% Modified-t UCL (Johnson-1978)	84.26 99% Chebyshev (MVUE) UCL	225.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.402 Data do not follow a Discernable Distribution (0.05)	
Theta Star	21.27	
MLE of Mean	72.37	
MLE of Standard Deviation	39.23	
nu star	81.66	
Approximate Chi Square Value (.05)	61.84 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	83.75
Adjusted Chi Square Value	59.21 95% Jackknife UCL	84.8
	95% Standard Bootstrap UCL	83.4
Anderson-Darling Test Statistic	1.634 95% Bootstrap-t UCL	82.5
Anderson-Darling 5% Critical Value	0.734 95% Hall's Bootstrap UCL	81.54
Kolmogorov-Smirnov Test Statistic	0.392 95% Percentile Bootstrap UCL	82.61
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	80.86
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	102.5
	97.5% Chebyshev(Mean, Sd) UCL	115.6
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	141.2
95% Approximate Gamma UCL	95.57	
95% Adjusted Gamma UCL	99.81	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 102.5

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.084 Minimum of Log Data	-2.477
Maximum	5 Maximum of Log Data	1.609
Mean	4.508 Mean of log Data	1.252
Median	5 SD of log Data	1.175
SD	1.406	
Coefficient of Variation	0.312	
Skewness	-3.356	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.406 Shapiro Wilk Test Statistic	0.347
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.237	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	21.98
95% Adjusted-CLT UCL (Chen-1995)	4.756	95% Chebyshev (MVUE) UCL	16.64
95% Modified-t UCL (Johnson-1978)	5.172	97.5% Chebyshev (MVUE) UCL	21.08
		99% Chebyshev (MVUE) UCL	29.78

Gamma Distribution Test

k star (bias corrected)	1.644	Data Distribution	
Theta Star	2.742	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.508		
MLE of Standard Deviation	3.516		
nu star	39.46		
Approximate Chi Square Value (.05)	26.07	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.176
Adjusted Chi Square Value	24.41	95% Jackknife UCL	5.237
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.904	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.508	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.278
		97.5% Chebyshev(Mean, Sd) UCL	7.043
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.547
95% Approximate Gamma UCL	6.824		
95% Adjusted Gamma UCL	7.286		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 6.278

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.065	Minimum of Log Data	-2.733
Maximum	13.29	Maximum of Log Data	2.587
Mean	9.429	Mean of log Data	1.904
Median		10 SD of log Data	1.463
SD	3.121		
Coefficient of Variation	0.331		
Skewness	-2.723		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Test Statistic	0.376
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	11.05	95% H-UCL	105.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	50.7
95% Adjusted-CLT UCL (Chen-1995)	10.15	97.5% Chebyshev (MVUE) UCL	65.36
95% Modified-t UCL (Johnson-1978)	10.93	99% Chebyshev (MVUE) UCL	94.16

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.27	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.424		
MLE of Mean	9.429		
MLE of Standard Deviation	8.366		
nu star	30.48		
Approximate Chi Square Value (.05)	18.87	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.91
Adjusted Chi Square Value	17.49	95% Jackknife UCL	11.05
		95% Standard Bootstrap UCL	10.85
Anderson-Darling Test Statistic	3.568	95% Bootstrap-t UCL	10.51
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	10.44
Kolmogorov-Smirnov Test Statistic	0.521	95% Percentile Bootstrap UCL	10.61
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	10.39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.36
		97.5% Chebyshev(Mean, Sd) UCL	15.05
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.39
95% Approximate Gamma UCL	15.23		
95% Adjusted Gamma UCL	16.43		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 13.36

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-12.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

Minimum	13.2	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.58
Mean	61.36	Maximum of Log Data	4.443
Median	61.36	Mean of log Data	4.016
SD	22.83	SD of log Data	0.537
Coefficient of Variation	0.372		
Skewness	-0.801		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.866	Shapiro Wilk Test Statistic	0.754
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	91.34
95% Adjusted-CLT UCL (Chen-1995)	70.57	95% Chebyshev (MVUE) UCL	107.1
95% Modified-t UCL (Johnson-1978)	72.94	97.5% Chebyshev (MVUE) UCL	126.1
		99% Chebyshev (MVUE) UCL	163.4

Gamma Distribution Test

k star (bias corrected)	3.912	Data Distribution	
Theta Star	15.69	Data appear Normal at 5% Significance Level	
MLE of Mean	61.36		
MLE of Standard Deviation	31.02		
nu star	93.89		
Approximate Chi Square Value (.05)	72.54	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	72.2
Adjusted Chi Square Value	69.68	95% Jackknife UCL	73.19
		95% Standard Bootstrap UCL	71.78
Anderson-Darling Test Statistic	0.951	95% Bootstrap-t UCL	71.7
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	70.88
Kolmogorov-Smirnov Test Statistic	0.309	95% Percentile Bootstrap UCL	71.4
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	71.12
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	90.08
		97.5% Chebyshev(Mean, Sd) UCL	102.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	126.9
95% Approximate Gamma UCL	79.41		
95% Adjusted Gamma UCL	82.67		

Potential UCL to Use		Use 95% Student's-t UCL	73.19
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	10 Minimum of Log Data	2.303
Maximum	78.6 Maximum of Log Data	4.364
Mean	61.29 Mean of log Data	4.028
Median	65 SD of log Data	0.55
SD	17.15	
Coefficient of Variation	0.28	
Skewness	-2.719	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.611 Shapiro Wilk Test Statistic	0.456
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	70.18 95% H-UCL	94.15
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	110.2
95% Adjusted-CLT UCL (Chen-1995)	65.28 97.5% Chebyshev (MVUE) UCL	130.1
95% Modified-t UCL (Johnson-1978)	69.53 99% Chebyshev (MVUE) UCL	169

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.48 Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.68	
MLE of Mean	61.29	
MLE of Standard Deviation	28.96	
nu star	107.5	
Approximate Chi Square Value (.05)	84.58 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	69.43
Adjusted Chi Square Value	81.48 95% Jackknife UCL	70.18
	95% Standard Bootstrap UCL	69.1
Anderson-Darling Test Statistic	2.72 95% Bootstrap-t UCL	67.44
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	66.5
Kolmogorov-Smirnov Test Statistic	0.471 95% Percentile Bootstrap UCL	67.77
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	66.69
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	82.87
	97.5% Chebyshev(Mean, Sd) UCL	92.21
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	110.6
95% Approximate Gamma UCL	77.9	
95% Adjusted Gamma UCL	80.87	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 82.87

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.36	Minimum of Log Data	-1.022
Maximum	11.98	Maximum of Log Data	2.483
Mean	9.043	Mean of log Data	2.007
Median		10 SD of log Data	0.957
SD	2.853		
Coefficient of Variation	0.315		
Skewness	-2.932		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.57	Shapiro Wilk Test Statistic	0.397
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.52	95% H-UCL	26.68
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	25.53
95% Adjusted-CLT UCL (Chen-1995)	9.652	97.5% Chebyshev (MVUE) UCL	31.74
95% Modified-t UCL (Johnson-1978)	10.41	99% Chebyshev (MVUE) UCL	43.94

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.096	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.313		
MLE of Mean	9.043		
MLE of Standard Deviation	6.245		
nu star	50.31		
Approximate Chi Square Value (.05)	35.02	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.4
Adjusted Chi Square Value	33.09	95% Jackknife UCL	10.52
		95% Standard Bootstrap UCL	10.33
Anderson-Darling Test Statistic	3.244	95% Bootstrap-t UCL	10.02
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	9.861
Kolmogorov-Smirnov Test Statistic	0.497	95% Percentile Bootstrap UCL	10.09
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	9.931
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.63
		97.5% Chebyshev(Mean, Sd) UCL	14.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.24
95% Approximate Gamma UCL	12.99		
95% Adjusted Gamma UCL	13.75		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	12.63
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-13.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	6
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Raw Statistics

		Log-transformed Statistics	
Minimum	15	Minimum of Log Data	2.708
Maximum	85	Maximum of Log Data	4.443
Mean	62.92	Mean of log Data	4.064
Median	62.92	SD of log Data	0.464
SD	20.97		
Coefficient of Variation	0.333		
Skewness	-0.818		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Test Statistic	0.758
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	72.46	95% H-UCL	83.33
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	98.72
95% Adjusted-CLT UCL (Chen-1995)	70.61	97.5% Chebyshev (MVUE) UCL	113.6
95% Modified-t UCL (Johnson-1978)	72.27	99% Chebyshev (MVUE) UCL	142.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.286	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.9		
MLE of Mean	62.92		
MLE of Standard Deviation	27.37		
nu star	158.6		
Approximate Chi Square Value (.05)	130.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	71.83
Adjusted Chi Square Value	127.3	95% Jackknife UCL	72.46
		95% Standard Bootstrap UCL	71.36
Anderson-Darling Test Statistic	1.086	95% Bootstrap-t UCL	71.29
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	70.96
Kolmogorov-Smirnov Test Statistic	0.285	95% Percentile Bootstrap UCL	71.44
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	70.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.53
		97.5% Chebyshev(Mean, Sd) UCL	96.74
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	116.8
95% Approximate Gamma UCL	76.48		
95% Adjusted Gamma UCL	78.36		

Potential UCL to Use

Use 95% Student's-t UCL	72.46
or 95% Modified-t UCL	72.27

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 4

Raw Statistics

Minimum	9.8	Minimum of Log Data	2.282
Maximum	65	Maximum of Log Data	4.174
Mean	58.35	Mean of log Data	4
Median	60.31	SD of log Data	0.478
SD	13.81		
Coefficient of Variation	0.237		
Skewness	-3.514		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.467	Shapiro Wilk Test Statistic	0.369
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.63	95% H-UCL	79.49
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	94.26
95% Adjusted-CLT UCL (Chen-1995)	60.75	97.5% Chebyshev (MVUE) UCL	108.8
95% Modified-t UCL (Johnson-1978)	64.09	99% Chebyshev (MVUE) UCL	137.3

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	6.206	Data Distribution	
Theta Star	9.402	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.35		
MLE of Standard Deviation	23.42		
nu star	186.2		
Approximate Chi Square Value (.05)	155.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	64.21
Adjusted Chi Square Value	152.2	95% Jackknife UCL	64.63
		95% Standard Bootstrap UCL	64.06
Anderson-Darling Test Statistic	3.89	95% Bootstrap-t UCL	62.64
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	61.99
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	62.78
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	62.03
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	73.89
		97.5% Chebyshev(Mean, Sd) UCL	80.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	93.83
95% Approximate Gamma UCL	69.8		
95% Adjusted Gamma UCL	71.38		

Potential UCL to Use Use 95% Student's-t UCL 64.63
 or 95% Modified-t UCL 64.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

15 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-14.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	8
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Raw Statistics

Minimum	34.01	Log-transformed Statistics	
Maximum	62.01	Minimum of Log Data	3.527
Mean	52.12	85 Maximum of Log Data	4.443
Median	22.51	Mean of log Data	4.063
SD	0.363	SD of log Data	0.378
Coefficient of Variation	0.0734		
Skewness			

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.748	Shapiro Wilk Test Statistic	0.783
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.14	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	77.49
95% Adjusted-CLT UCL (Chen-1995)	72.41	95% Chebyshev (MVUE) UCL	90.86
95% Modified-t UCL (Johnson-1978)	73.16	97.5% Chebyshev (MVUE) UCL	103.3
		99% Chebyshev (MVUE) UCL	127.8

Gamma Distribution Test

k star (bias corrected)	6.149	Data Distribution	
Theta Star	10.08	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	62.01		
MLE of Standard Deviation	25.01		
nu star	159.9		
Approximate Chi Square Value (.05)	131.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	72.28
Adjusted Chi Square Value	128	95% Jackknife UCL	73.14
		95% Standard Bootstrap UCL	72.05
Anderson-Darling Test Statistic	1.457	95% Bootstrap-t UCL	73.75
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	70.93
Kolmogorov-Smirnov Test Statistic	0.315	95% Percentile Bootstrap UCL	71.88
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	72.47
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	89.22
		97.5% Chebyshev(Mean, Sd) UCL	101
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	124.1
95% Approximate Gamma UCL	75.31		
95% Adjusted Gamma UCL	77.46		

Potential UCL to Use

Use 95% Student's-t UCL	73.14
or 95% Modified-t UCL	73.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.0491 Minimum of Log Data	-3.014
Maximum	10 Maximum of Log Data	2.303
Mean	9.091 Mean of log Data	1.878
Median	10 SD of log Data	1.471
SD	2.765	
Coefficient of Variation	0.304	
Skewness	-3.41	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.386 Shapiro Wilk Test Statistic	0.328
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.46 95% H-UCL	93.84
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	49.67
95% Adjusted-CLT UCL (Chen-1995)	9.578 97.5% Chebyshev (MVUE) UCL	63.94
95% Modified-t UCL (Johnson-1978)	10.34 99% Chebyshev (MVUE) UCL	91.97

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.332 Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.827	
MLE of Mean	9.091	
MLE of Standard Deviation	7.879	
nu star	34.62	
Approximate Chi Square Value (.05)	22.16 Nonparametric Statistics	
Adjusted Level of Significance	0.0301 95% CLT UCL	10.35
Adjusted Chi Square Value	20.75 95% Jackknife UCL	10.46
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.418 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.748 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.496 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.24 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.43
	97.5% Chebyshev(Mean, Sd) UCL	13.88
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	16.72
95% Approximate Gamma UCL	14.2	
95% Adjusted Gamma UCL	15.17	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.43
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-15.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	7
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	39.11	Minimum of Log Data	3.666
Maximum	85	Maximum of Log Data	4.443
Mean	69.68	Mean of log Data	4.206
Median	77.34	SD of log Data	0.298
SD	18.29		
Coefficient of Variation	0.263		
Skewness	-0.684		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.778	Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	77.7	95% H-UCL	80.94
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	92.85
95% Adjusted-CLT UCL (Chen-1995)	76.37	97.5% Chebyshev (MVUE) UCL	102.8
95% Modified-t UCL (Johnson-1978)	77.57	99% Chebyshev (MVUE) UCL	122.3

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	10.81	Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.447		
MLE of Mean	69.68		
MLE of Standard Deviation	21.19		
nu star	345.9		
Approximate Chi Square Value (.05)	303.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	77.21
Adjusted Chi Square Value	299.3	95% Jackknife UCL	77.7
		95% Standard Bootstrap UCL	77.01
Anderson-Darling Test Statistic	1.595	95% Bootstrap-t UCL	76.84
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	75.87
Kolmogorov-Smirnov Test Statistic	0.299	95% Percentile Bootstrap UCL	76.69
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	75.95
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	89.62
		97.5% Chebyshev(Mean, Sd) UCL	98.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	115.2
95% Approximate Gamma UCL	79.34		
95% Adjusted Gamma UCL	80.53		

Potential UCL to Use

Use 95% Student's-t UCL	77.7
or 95% Modified-t UCL	77.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	10 Minimum of Log Data	2.303
Maximum	11.68 Maximum of Log Data	2.458
Mean	10.13 Mean of log Data	2.315
Median	10 SD of log Data	0.0385
SD	0.417	
Coefficient of Variation	0.0411	
Skewness	3.898	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.346 Shapiro Wilk Test Statistic	0.352
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.31 95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	10.55
95% Adjusted-CLT UCL (Chen-1995)	10.41 97.5% Chebyshev (MVUE) UCL	10.74
95% Modified-t UCL (Johnson-1978)	10.33 99% Chebyshev (MVUE) UCL	11.1

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	559 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0181	
MLE of Mean	10.13	
MLE of Standard Deviation	0.428	
nu star	17889	
Approximate Chi Square Value (.05)	17579 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	10.3
Adjusted Chi Square Value	17544 95% Jackknife UCL	10.31
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.602 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.736 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.433 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.214 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	10.58
	97.5% Chebyshev(Mean, Sd) UCL	10.78
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	11.17
95% Approximate Gamma UCL	10.31	
95% Adjusted Gamma UCL	10.33	

Potential UCL to Use Use 95% Student's-t UCL 10.31
 or 95% Modified-t UCL 10.33

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-16.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 7

Raw Statistics

Minimum	6.14	Log-transformed Statistics	
Maximum	17.8	Minimum of Log Data	1.815
Mean	10.35	Maximum of Log Data	2.879
Median	11	Mean of log Data	2.307
SD	2.664	SD of log Data	0.257
Coefficient of Variation	0.257		
Skewness	0.98		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.767	Shapiro Wilk Test Statistic	0.8
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.52	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.72
95% Adjusted-CLT UCL (Chen-1995)	11.62	95% Chebyshev (MVUE) UCL	13.28
95% Modified-t UCL (Johnson-1978)	11.55	97.5% Chebyshev (MVUE) UCL	14.55
		99% Chebyshev (MVUE) UCL	17.03

Gamma Distribution Test

k star (bias corrected)	13.51	Data Distribution	
Theta Star	0.766	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.35		
MLE of Standard Deviation	2.817		
nu star	432.2		
Approximate Chi Square Value (.05)	385	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	11.45
Adjusted Chi Square Value	380	95% Jackknife UCL	11.52
		95% Standard Bootstrap UCL	11.41
Anderson-Darling Test Statistic	1.716	95% Bootstrap-t UCL	11.63
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	12.16
Kolmogorov-Smirnov Test Statistic	0.317	95% Percentile Bootstrap UCL	11.43
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	11.57
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.25
		97.5% Chebyshev(Mean, Sd) UCL	14.51
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.98
95% Approximate Gamma UCL	11.62		
95% Adjusted Gamma UCL	11.78		

Potential UCL to Use

Use 95% Student's-t UCL 11.52
or 95% Modified-t UCL 11.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations

16 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 10

Raw Statistics

Minimum	17.1	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.839
Mean	59.25	Maximum of Log Data	4.443
Median	50.23	Mean of log Data	3.985
SD	24.63	SD of log Data	0.482
Coefficient of Variation	0.416		
Skewness	-0.0583		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.813	Shapiro Wilk Test Statistic	0.839
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.05	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	77.72
95% Adjusted-CLT UCL (Chen-1995)	69.29	95% Chebyshev (MVUE) UCL	92.25
95% Modified-t UCL (Johnson-1978)	70.03	97.5% Chebyshev (MVUE) UCL	106.3
		99% Chebyshev (MVUE) UCL	133.8

Gamma Distribution Test

k star (bias corrected)	4.351	Data Distribution	
Theta Star	13.62	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	59.25		
MLE of Standard Deviation	28.4		
nu star	139.2		
Approximate Chi Square Value (.05)	113	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	69.38
Adjusted Chi Square Value	110.3	95% Jackknife UCL	70.05
		95% Standard Bootstrap UCL	69.13
Anderson-Darling Test Statistic	1.146	95% Bootstrap-t UCL	69.91
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	69.02
Kolmogorov-Smirnov Test Statistic	0.285	95% Percentile Bootstrap UCL	68.82
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	69.13
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.1
		97.5% Chebyshev(Mean, Sd) UCL	97.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	120.5
95% Approximate Gamma UCL	73.03		
95% Adjusted Gamma UCL	74.81		

Potential UCL to Use

Use 95% Student's-t UCL 70.05
or 95% Modified-t UCL 70.03

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	8.6 Minimum of Log Data	2.152
Maximum	72.03 Maximum of Log Data	4.277
Mean	61.5 Mean of log Data	4.048
Median	65 SD of log Data	0.507
SD	14.35	
Coefficient of Variation	0.233	
Skewness	-3.771	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.392 Shapiro Wilk Test Statistic	0.324
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	67.79 95% H-UCL	85.26
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	101.4
95% Adjusted-CLT UCL (Chen-1995)	63.79 97.5% Chebyshev (MVUE) UCL	117.3
95% Modified-t UCL (Johnson-1978)	67.23 99% Chebyshev (MVUE) UCL	148.6

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.858 Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.5	
MLE of Mean	61.5	
MLE of Standard Deviation	25.41	
nu star	187.5	
Approximate Chi Square Value (.05)	156.8 Nonparametric Statistics	
Adjusted Level of Significance	0.0335 95% CLT UCL	67.4
Adjusted Chi Square Value	153.6 95% Jackknife UCL	67.79
	95% Standard Bootstrap UCL	67.28
Anderson-Darling Test Statistic	4.922 95% Bootstrap-t UCL	65.93
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	65.18
Kolmogorov-Smirnov Test Statistic	0.483 95% Percentile Bootstrap UCL	65.6
Kolmogorov-Smirnov 5% Critical Value	0.216 95% BCA Bootstrap UCL	65.44
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	77.14
	97.5% Chebyshev(Mean, Sd) UCL	83.91
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	97.21
95% Approximate Gamma UCL	73.53	
95% Adjusted Gamma UCL	75.06	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) U 77.14

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations

16 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations

16 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-17.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	6.41	Minimum of Log Data	1.858
Maximum	13.96	Maximum of Log Data	2.636
Mean	10.67	Mean of log Data	2.354
Median	10.84	SD of log Data	0.179
SD	1.692		
Coefficient of Variation	0.159		
Skewness	-0.962		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.786	Shapiro Wilk Test Statistic	0.726
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.55	95% H-UCL	11.81
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.1
95% Adjusted-CLT UCL (Chen-1995)	11.33	97.5% Chebyshev (MVUE) UCL	14.14
95% Modified-t UCL (Johnson-1978)	11.52	99% Chebyshev (MVUE) UCL	16.2

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	28.08	Data Distribution	
Theta Star	0.38	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.67		
MLE of Standard Deviation	2.014		
nu star	673.9		
Approximate Chi Square Value (.05)	614.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.47
Adjusted Chi Square Value	606	95% Jackknife UCL	11.55
		95% Standard Bootstrap UCL	11.44
Anderson-Darling Test Statistic	1.484	95% Bootstrap-t UCL	11.39
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11.43
Kolmogorov-Smirnov Test Statistic	0.355	95% Percentile Bootstrap UCL	11.39
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.8
		97.5% Chebyshev(Mean, Sd) UCL	13.72
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.53
95% Approximate Gamma UCL	11.7		
95% Adjusted Gamma UCL	11.86		

Potential UCL to Use

Use 95% Student's-t UCL	11.55
or 95% Modified-t UCL	11.52

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cadmium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics	Log-transformed Statistics	
Minimum	16.4 Minimum of Log Data	2.797
Maximum	85 Maximum of Log Data	4.443
Mean	53.58 Mean of log Data	3.889
Median	53.58 SD of log Data	0.477
SD	22.07	
Coefficient of Variation	0.412	
Skewness	0.214	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.902 Shapiro Wilk Test Statistic	0.892
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	65.02 95% H-UCL	74.22
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	87.46
95% Adjusted-CLT UCL (Chen-1995)	64.48 97.5% Chebyshev (MVUE) UCL	101.8
95% Modified-t UCL (Johnson-1978)	65.09 99% Chebyshev (MVUE) UCL	130.1

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	4.243 Data appear Normal at 5% Significance Level	
Theta Star	12.63	
MLE of Mean	53.58	
MLE of Standard Deviation	26.01	
nu star	101.8	
Approximate Chi Square Value (.05)	79.55 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	64.06
Adjusted Chi Square Value	76.55 95% Jackknife UCL	65.02
	95% Standard Bootstrap UCL	63.65
Anderson-Darling Test Statistic	0.499 95% Bootstrap-t UCL	66.78
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	64.73
Kolmogorov-Smirnov Test Statistic	0.194 95% Percentile Bootstrap UCL	63.92
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	63.41
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	81.35
	97.5% Chebyshev(Mean, Sd) UCL	93.37
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	117
95% Approximate Gamma UCL	68.59	
95% Adjusted Gamma UCL	71.28	

Potential UCL to Use Use 95% Student's-t UCL 65.02

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-18.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

Minimum	6.05	Log-transformed Statistics	
Maximum	13.5	Minimum of Log Data	1.8
Mean	9.234	Maximum of Log Data	2.603
Median	8.86	Mean of log Data	2.188
SD	2.571	SD of log Data	0.275
Coefficient of Variation	0.278		
Skewness	0.511		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.57	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.84
95% Adjusted-CLT UCL (Chen-1995)	10.57	95% Chebyshev (MVUE) UCL	12.45
95% Modified-t UCL (Johnson-1978)	10.59	97.5% Chebyshev (MVUE) UCL	13.84
		99% Chebyshev (MVUE) UCL	16.58

Gamma Distribution Test

k star (bias corrected)	10.93	Data Distribution	
Theta Star	0.845	Data appear Normal at 5% Significance Level	
MLE of Mean	9.234		
MLE of Standard Deviation	2.793		
nu star	262.3		
Approximate Chi Square Value (.05)	225.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.45
Adjusted Chi Square Value	220.6	95% Jackknife UCL	10.57
		95% Standard Bootstrap UCL	10.39
Anderson-Darling Test Statistic	0.365	95% Bootstrap-t UCL	10.81
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10.49
Kolmogorov-Smirnov Test Statistic	0.185	95% Percentile Bootstrap UCL	10.45
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.48
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.47
		97.5% Chebyshev(Mean, Sd) UCL	13.87
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.62
95% Approximate Gamma UCL	10.73		
95% Adjusted Gamma UCL	10.98		

Potential UCL to Use

		Use 95% Student's-t UCL	10.57
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

Raw Statistics		Log-transformed Statistics	
Minimum	17.2	Minimum of Log Data	2.845
Maximum	85	Maximum of Log Data	4.443
Mean	68.78	Mean of log Data	4.145
Median	85	SD of log Data	0.494
SD	23.37		
Coefficient of Variation	0.34		
Skewness	-1.278		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.748	Shapiro Wilk Test Statistic	0.687
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	80.89	95% H-UCL	98.01
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	115.4
95% Adjusted-CLT UCL (Chen-1995)	77.22	97.5% Chebyshev (MVUE) UCL	134.8
95% Modified-t UCL (Johnson-1978)	80.48	99% Chebyshev (MVUE) UCL	172.9

Gamma Distribution Test

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.546	Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.13		
MLE of Mean	68.78		
MLE of Standard Deviation	32.26		
nu star	109.1		
Approximate Chi Square Value (.05)	85.99	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	79.87
Adjusted Chi Square Value	82.87	95% Jackknife UCL	80.89
		95% Standard Bootstrap UCL	79.69
Anderson-Darling Test Statistic	1.505	95% Bootstrap-t UCL	78.7
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	77.6
Kolmogorov-Smirnov Test Statistic	0.332	95% Percentile Bootstrap UCL	78.56
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	77.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	98.18
		97.5% Chebyshev(Mean, Sd) UCL	110.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	135.9
95% Approximate Gamma UCL	87.26		
95% Adjusted Gamma UCL	90.55		

Potential UCL to Use

Use 95% Student's-t UCL	80.89
or 95% Modified-t UCL	80.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	14 Minimum of Log Data	2.639
Maximum	65 Maximum of Log Data	4.174
Mean	60.15 Mean of log Data	4.037
Median	65 SD of log Data	0.441
SD	14.68	
Coefficient of Variation	0.244	
Skewness	-3.35	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.388 Shapiro Wilk Test Statistic	0.361
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	67.76 95% H-UCL	82.25
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	96.92
95% Adjusted-CLT UCL (Chen-1995)	62.74 97.5% Chebyshev (MVUE) UCL	112.1
95% Modified-t UCL (Johnson-1978)	67.08 99% Chebyshev (MVUE) UCL	141.8

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	6.409 Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.385	
MLE of Mean	60.15	
MLE of Standard Deviation	23.76	
nu star	153.8	
Approximate Chi Square Value (.05)	126.1 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	67.12
Adjusted Chi Square Value	122.3 95% Jackknife UCL	67.76
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.715 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.467 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	78.62
	97.5% Chebyshev(Mean, Sd) UCL	86.61
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	102.3
95% Approximate Gamma UCL	73.34	
95% Adjusted Gamma UCL	75.63	

Potential UCL to Use Use 95% Student's-t UCL 67.76
 or 95% Modified-t UCL 67.08

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-19.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

		Log-transformed Statistics	
Minimum	6	Minimum of Log Data	1.792
Maximum	12	Maximum of Log Data	2.485
Mean	9.775	Mean of log Data	2.262
Median	9.775	SD of log Data	0.207
SD	1.771		
Coefficient of Variation	0.181		
Skewness	-1.245		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.836	Shapiro Wilk Test Statistic	0.782
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.69	95% H-UCL	11.01
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.35
95% Adjusted-CLT UCL (Chen-1995)	10.42	97.5% Chebyshev (MVUE) UCL	13.46
95% Modified-t UCL (Johnson-1978)	10.66	99% Chebyshev (MVUE) UCL	15.64

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	21.09	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.464		
MLE of Mean	9.775		
MLE of Standard Deviation	2.129		
nu star	506.1		
Approximate Chi Square Value (.05)	454.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.62
Adjusted Chi Square Value	447.5	95% Jackknife UCL	10.69
		95% Standard Bootstrap UCL	10.57
Anderson-Darling Test Statistic	1.127	95% Bootstrap-t UCL	10.52
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10.45
Kolmogorov-Smirnov Test Statistic	0.29	95% Percentile Bootstrap UCL	10.53
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12
		97.5% Chebyshev(Mean, Sd) UCL	12.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.86
95% Approximate Gamma UCL	10.87		
95% Adjusted Gamma UCL	11.05		

Potential UCL to Use

Use 95% Student's-t UCL	10.69
or 95% Modified-t UCL	10.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

Minimum	13.6	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.61
Mean	53.77	Maximum of Log Data	4.443
Median	53.77	Mean of log Data	3.887
SD	22.04	SD of log Data	0.504
Coefficient of Variation	0.41		
Skewness	0.143		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	65.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	76.72
95% Adjusted-CLT UCL (Chen-1995)	64.51	95% Chebyshev (MVUE) UCL	90.28
95% Modified-t UCL (Johnson-1978)	65.24	97.5% Chebyshev (MVUE) UCL	105.7
		99% Chebyshev (MVUE) UCL	135.9

Gamma Distribution Test

k star (bias corrected)	4.022	Data Distribution	
Theta Star	13.37	Data appear Normal at 5% Significance Level	
MLE of Mean	53.77		
MLE of Standard Deviation	26.81		
nu star	96.54		
Approximate Chi Square Value (.05)	74.87	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	64.23
Adjusted Chi Square Value	71.97	95% Jackknife UCL	65.19
		95% Standard Bootstrap UCL	64.01
Anderson-Darling Test Statistic	0.606	95% Bootstrap-t UCL	65.58
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	65.52
Kolmogorov-Smirnov Test Statistic	0.192	95% Percentile Bootstrap UCL	64.17
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	64.07
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.5
		97.5% Chebyshev(Mean, Sd) UCL	93.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117.1
95% Approximate Gamma UCL	69.32		
95% Adjusted Gamma UCL	72.12		

Potential UCL to Use Use 95% Student's-t UCL 65.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	55.62	Minimum of Log Data 4.019
Maximum	65	Maximum of Log Data 4.174
Mean	63	Mean of log Data 4.142
Median	64	SD of log Data 0.0497
SD	3.012	
Coefficient of Variation	0.0478	
Skewness	-1.806	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.702	Shapiro Wilk Test Statistic 0.692
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	64.56	95% H-UCL N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 66.94
95% Adjusted-CLT UCL (Chen-1995)	63.95	97.5% Chebyshev (MVUE) UCL 68.65
95% Modified-t UCL (Johnson-1978)	64.49	99% Chebyshev (MVUE) UCL 72

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	340.1	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.185	
MLE of Mean	63	
MLE of Standard Deviation	3.416	
nu star	8163	
Approximate Chi Square Value (.05)	7954	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 64.43
Adjusted Chi Square Value	7922	95% Jackknife UCL 64.56
		95% Standard Bootstrap UCL 64.33
Anderson-Darling Test Statistic	1.601	95% Bootstrap-t UCL 64.2
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL 64.04
Kolmogorov-Smirnov Test Statistic	0.34	95% Percentile Bootstrap UCL 64.33
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL 64
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 66.79
		97.5% Chebyshev(Mean, Sd) UCL 68.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 71.65
95% Approximate Gamma UCL	64.66	
95% Adjusted Gamma UCL	64.91	

Potential UCL to Use Use 95% Student's-t UCL 64.56
 or 95% Modified-t UCL 64.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-20.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	5.67	Log-transformed Statistics	
Maximum	16.4	Minimum of Log Data	1.735
Mean	10.32	Maximum of Log Data	2.797
Median	11	Mean of log Data	2.295
SD	2.926	SD of log Data	0.3
Coefficient of Variation	0.284		
Skewness	0.249		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.9	Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.84	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.35
95% Adjusted-CLT UCL (Chen-1995)	11.77	95% Chebyshev (MVUE) UCL	14.27
95% Modified-t UCL (Johnson-1978)	11.85	97.5% Chebyshev (MVUE) UCL	15.98
		99% Chebyshev (MVUE) UCL	19.32

Gamma Distribution Test

k star (bias corrected)	9.712	Data Distribution	
Theta Star	1.063	Data appear Normal at 5% Significance Level	
MLE of Mean	10.32		
MLE of Standard Deviation	3.311		
nu star	233.1		
Approximate Chi Square Value (.05)	198.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.71
Adjusted Chi Square Value	193.9	95% Jackknife UCL	11.84
		95% Standard Bootstrap UCL	11.64
Anderson-Darling Test Statistic	0.777	95% Bootstrap-t UCL	11.84
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	12.07
Kolmogorov-Smirnov Test Statistic	0.294	95% Percentile Bootstrap UCL	11.69
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.74
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14
		97.5% Chebyshev(Mean, Sd) UCL	15.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.72
95% Approximate Gamma UCL	12.1		
95% Adjusted Gamma UCL	12.4		

Potential UCL to Use	Use 95% Student's-t UCL	11.84
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Barium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Beryllium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	32.59	Minimum of Log Data	3.484
Maximum	85	Maximum of Log Data	4.443
Mean	59.11	Mean of log Data	4.004
Median	49.97	SD of log Data	0.41
SD	23.52		
Coefficient of Variation	0.398		
Skewness	0.207		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.772	Shapiro Wilk Test Statistic	0.809
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.31	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	76.67
95% Adjusted-CLT UCL (Chen-1995)	70.71	95% Chebyshev (MVUE) UCL	90.18
95% Modified-t UCL (Johnson-1978)	71.37	97.5% Chebyshev (MVUE) UCL	103.6
		99% Chebyshev (MVUE) UCL	130

Gamma Distribution Test

k star (bias corrected)	5.123	Data Distribution	
Theta Star	11.54	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	59.11		
MLE of Standard Deviation	26.12		
nu star	122.9		
Approximate Chi Square Value (.05)	98.34	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	70.28
Adjusted Chi Square Value	94.98	95% Jackknife UCL	71.31
		95% Standard Bootstrap UCL	69.74
Anderson-Darling Test Statistic	1.105	95% Bootstrap-t UCL	73.58
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	69.02
Kolmogorov-Smirnov Test Statistic	0.287	95% Percentile Bootstrap UCL	70
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	70.36
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	88.71
		97.5% Chebyshev(Mean, Sd) UCL	101.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	126.7
95% Approximate Gamma UCL	73.91		
95% Adjusted Gamma UCL	76.52		

Potential UCL to Use

Use 95% Student's-t UCL 71.31
or 95% Modified-t UCL 71.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	189 Minimum of Log Data	5.242
Maximum	4670 Maximum of Log Data	8.449
Mean	725.9 Mean of log Data	6.082
Median	371.4 SD of log Data	0.8
SD	1246	
Coefficient of Variation	1.716	
Skewness	3.425	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.402 Shapiro Wilk Test Statistic	0.686
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1372 95% H-UCL	1121
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1201
95% Adjusted-CLT UCL (Chen-1995)	1698 97.5% Chebyshev (MVUE) UCL	1468
95% Modified-t UCL (Johnson-1978)	1431 99% Chebyshev (MVUE) UCL	1993

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.9 Data do not follow a Discernable Distribution (0.05)	
Theta Star	806.5	
MLE of Mean	725.9	
MLE of Standard Deviation	765.1	
nu star	21.6	
Approximate Chi Square Value (.05)	12.04 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	1318
Adjusted Chi Square Value	10.97 95% Jackknife UCL	1372
	95% Standard Bootstrap UCL	1291
Anderson-Darling Test Statistic	2.337 95% Bootstrap-t UCL	6382
Anderson-Darling 5% Critical Value	0.754 95% Hall's Bootstrap UCL	4664
Kolmogorov-Smirnov Test Statistic	0.419 95% Percentile Bootstrap UCL	1426
Kolmogorov-Smirnov 5% Critical Value	0.252 95% BCA Bootstrap UCL	1768
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	2294
	97.5% Chebyshev(Mean, Sd) UCL	2972
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	4305
95% Approximate Gamma UCL	1302	
95% Adjusted Gamma UCL	1430	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2294

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.513
Maximum	10	Maximum of Log Data	2.303
Mean	8.942	Mean of log Data	1.791
Median	10	SD of log Data	1.673
SD	2.914		
Coefficient of Variation	0.326		
Skewness	-3.09		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.434	Shapiro Wilk Test Statistic	0.351
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.45	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	208.3
95% Adjusted-CLT UCL (Chen-1995)	9.524	95% Chebyshev (MVUE) UCL	64.46
95% Modified-t UCL (Johnson-1978)	10.33	97.5% Chebyshev (MVUE) UCL	83.92
		99% Chebyshev (MVUE) UCL	122.1

Gamma Distribution Test

k star (bias corrected)	1.102	Data Distribution	
Theta Star	8.115	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.942		
MLE of Standard Deviation	8.519		
nu star	26.45		
Approximate Chi Square Value (.05)	15.72	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.33
Adjusted Chi Square Value	14.48	95% Jackknife UCL	10.45

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.947	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.748	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.495	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	12.61
		97.5% Chebyshev(Mean, Sd) UCL	14.2
		99% Chebyshev(Mean, Sd) UCL	17.31

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.04
95% Adjusted Gamma UCL	16.34

Potential UCL to Use

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	17.31
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	15.8	Log-transformed Statistics	
Maximum	65.7	Minimum of Log Data	2.76
Mean	60.96	Maximum of Log Data	4.185
Median	65	Mean of log Data	4.057
SD	14.22	SD of log Data	0.409
Coefficient of Variation	0.233		
Skewness	-3.46		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.335	Shapiro Wilk Test Statistic	0.332
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	80.77
95% Adjusted-CLT UCL (Chen-1995)	63.33	95% Chebyshev (MVUE) UCL	95
95% Modified-t UCL (Johnson-1978)	67.65	97.5% Chebyshev (MVUE) UCL	109.1
		99% Chebyshev (MVUE) UCL	136.8

Gamma Distribution Test

k star (bias corrected)	7.284	Data Distribution	
Theta Star	8.369	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	60.96		
MLE of Standard Deviation	22.59		
nu star	174.8		
Approximate Chi Square Value (.05)	145.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	67.71
Adjusted Chi Square Value	141.1	95% Jackknife UCL	68.33

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.066	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.538	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	78.85
		97.5% Chebyshev(Mean, Sd) UCL	86.6
		99% Chebyshev(Mean, Sd) UCL	101.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	73.37
95% Adjusted Gamma UCL	75.51

Potential UCL to Use

Use 95% Student's-t UCL	68.33
or 95% Modified-t UCL	67.65

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.033	Minimum of Log Data -3.411
Maximum	12.22	Maximum of Log Data 2.503
Mean	9.354	Mean of log Data 1.843
Median	10	SD of log Data 1.656
SD	3.004	
Coefficient of Variation	0.321	
Skewness	-3.15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.448	Shapiro Wilk Test Statistic 0.348
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.91	95% H-UCL 204.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 65.89
95% Adjusted-CLT UCL (Chen-1995)	9.937	97.5% Chebyshev (MVUE) UCL 85.72
95% Modified-t UCL (Johnson-1978)	10.78	99% Chebyshev (MVUE) UCL 124.7

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.118	Data do not follow a Discernable Distribution (0.05)
Theta Star	8.366	
MLE of Mean	9.354	
MLE of Standard Deviation	8.846	
nu star	26.84	
Approximate Chi Square Value (.05)	16.02	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 10.78
Adjusted Chi Square Value	14.76	95% Jackknife UCL 10.91
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	4.056	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.558	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 13.13
		97.5% Chebyshev(Mean, Sd) UCL 14.77
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 17.98
95% Approximate Gamma UCL	15.67	
95% Adjusted Gamma UCL	17.01	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.98
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-22.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	34.27	Minimum of Log Data	3.534
Maximum	85	Maximum of Log Data	4.443
Mean	52.15	Mean of log Data	3.914
Median	50.56	SD of log Data	0.284
SD	16.54		
Coefficient of Variation	0.317		
Skewness	1.419		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.79	Shapiro Wilk Test Statistic	0.874
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	60.72	95% H-UCL	61.47
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	70.74
95% Adjusted-CLT UCL (Chen-1995)	62.09	97.5% Chebyshev (MVUE) UCL	78.85
95% Modified-t UCL (Johnson-1978)	61.05	99% Chebyshev (MVUE) UCL	94.78

Gamma Distribution Test

k star (bias corrected)	9.64	Data appear Lognormal at 5% Significance Level	
Theta Star	5.409		
MLE of Mean	52.15		
MLE of Standard Deviation	16.8		
nu star	231.4		
Approximate Chi Square Value (.05)	197.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	60
Adjusted Chi Square Value	192.3	95% Jackknife UCL	60.72
		95% Standard Bootstrap UCL	59.79
Anderson-Darling Test Statistic	0.817	95% Bootstrap-t UCL	69.44
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	116.3
Kolmogorov-Smirnov Test Statistic	0.296	95% Percentile Bootstrap UCL	60.42
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	61.71
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	72.96
		97.5% Chebyshev(Mean, Sd) UCL	81.96
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	99.65
95% Approximate Gamma UCL	61.2		
95% Adjusted Gamma UCL	62.73		

Potential UCL to Use

Use 95% Student's-t UCL	60.72
or 95% Modified-t UCL	61.05
or 95% H-UCL	61.47

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	77.88 Minimum of Log Data	4.355
Maximum	1700 Maximum of Log Data	7.438
Mean	564.7 Mean of log Data	6.131
Median	564.7 SD of log Data	0.716
SD	397.6	
Coefficient of Variation	0.704	
Skewness	2.279	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.739 Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	770.8 95% H-UCL	1006
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1124
95% Adjusted-CLT UCL (Chen-1995)	834.2 97.5% Chebyshev (MVUE) UCL	1360
95% Modified-t UCL (Johnson-1978)	783.4 99% Chebyshev (MVUE) UCL	1823

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.998 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	282.6	
MLE of Mean	564.7	
MLE of Standard Deviation	399.5	
nu star	47.96	
Approximate Chi Square Value (.05)	33.07 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	753.5
Adjusted Chi Square Value	31.19 95% Jackknife UCL	770.8
	95% Standard Bootstrap UCL	739.3
Anderson-Darling Test Statistic	0.732 95% Bootstrap-t UCL	928.5
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	1685
Kolmogorov-Smirnov Test Statistic	0.25 95% Percentile Bootstrap UCL	746.6
Kolmogorov-Smirnov 5% Critical Value	0.248 95% BCA Bootstrap UCL	842.2
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1065
	97.5% Chebyshev(Mean, Sd) UCL	1282
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1707
95% Approximate Gamma UCL	819.1	
95% Adjusted Gamma UCL	868.4	

Potential UCL to Use Use 95% Approximate Gamma UCL 819.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.35	Minimum of Log Data	-1.05
Maximum		18 Maximum of Log Data	2.89
Mean	5.415	Mean of log Data	1.301
Median		5 SD of log Data	1.134
SD	4.373		
Coefficient of Variation	0.808		
Skewness	2.264		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.629	Shapiro Wilk Test Statistic	0.665
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.682	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	20.6
95% Adjusted-CLT UCL (Chen-1995)	8.373	95% Chebyshev (MVUE) UCL	16.42
95% Modified-t UCL (Johnson-1978)	7.82	97.5% Chebyshev (MVUE) UCL	20.73
		99% Chebyshev (MVUE) UCL	29.19

Gamma Distribution Test

k star (bias corrected)	1.13	Data Distribution	
Theta Star	4.792	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.415		
MLE of Standard Deviation	5.094		
nu star	27.12		
Approximate Chi Square Value (.05)	16.25	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	7.492
Adjusted Chi Square Value	14.97	95% Jackknife UCL	7.682
		95% Standard Bootstrap UCL	7.417
Anderson-Darling Test Statistic	1.938	95% Bootstrap-t UCL	9.175
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	17.59
Kolmogorov-Smirnov Test Statistic	0.408	95% Percentile Bootstrap UCL	7.547
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	8.354
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.92
		97.5% Chebyshev(Mean, Sd) UCL	13.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.98
95% Approximate Gamma UCL	9.04		
95% Adjusted Gamma UCL	9.809		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	10.92
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-23.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	5.82	Minimum of Log Data	1.761
Maximum	18.03	Maximum of Log Data	2.892
Mean	9.833	Mean of log Data	2.246
Median	9.306	SD of log Data	0.289
SD	3.118		
Coefficient of Variation	0.317		
Skewness	1.621		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.844	Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.45	95% H-UCL	11.64
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.42
95% Adjusted-CLT UCL (Chen-1995)	11.76	97.5% Chebyshev (MVUE) UCL	14.97
95% Modified-t UCL (Johnson-1978)	11.52	99% Chebyshev (MVUE) UCL	18.04

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	9.507	Data Distribution	
Theta Star	1.034	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	9.833		
MLE of Standard Deviation	3.189		
nu star	228.2		
Approximate Chi Square Value (.05)	194.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.31
Adjusted Chi Square Value	189.4	95% Jackknife UCL	11.45
		95% Standard Bootstrap UCL	11.27
Anderson-Darling Test Statistic	0.456	95% Bootstrap-t UCL	12.16
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	18.85
Kolmogorov-Smirnov Test Statistic	0.226	95% Percentile Bootstrap UCL	11.38
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.47
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.76
		97.5% Chebyshev(Mean, Sd) UCL	15.45
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.79
95% Approximate Gamma UCL	11.55		
95% Adjusted Gamma UCL	11.84		

Potential UCL to Use		Use 95% Approximate Gamma UCL	11.55
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

Minimum	36.93	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.609
Mean	61.03	Maximum of Log Data	4.443
Median	59.21	Mean of log Data	4.062
SD	19.75	SD of log Data	0.331
Coefficient of Variation	0.324		
Skewness	0.208		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.27	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	74.59
95% Adjusted-CLT UCL (Chen-1995)	70.77	95% Chebyshev (MVUE) UCL	86.79
95% Modified-t UCL (Johnson-1978)	71.32	97.5% Chebyshev (MVUE) UCL	97.92
		99% Chebyshev (MVUE) UCL	119.8

Gamma Distribution Test

k star (bias corrected)	7.75	Data Distribution	
Theta Star	7.875	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	61.03		
MLE of Standard Deviation	21.92		
nu star	186		
Approximate Chi Square Value (.05)	155.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	70.41
Adjusted Chi Square Value	151.2	95% Jackknife UCL	71.27
		95% Standard Bootstrap UCL	70.02
Anderson-Darling Test Statistic	0.667	95% Bootstrap-t UCL	71.72
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	69.18
Kolmogorov-Smirnov Test Statistic	0.223	95% Percentile Bootstrap UCL	69.82
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	70.27
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	85.88
		97.5% Chebyshev(Mean, Sd) UCL	96.63
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117.8
95% Approximate Gamma UCL	73.02		
95% Adjusted Gamma UCL	75.08		

Potential UCL to Use Use 95% Approximate Gamma UCL 73.02

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	8291 Minimum of Log Data	9.023
Maximum	33875 Maximum of Log Data	10.43
Mean	14986 Mean of log Data	9.554
Median	13464 SD of log Data	0.339
SD	6428	
Coefficient of Variation	0.429	
Skewness	2.586	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.702 Shapiro Wilk Test Statistic	0.877
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	18319 95% H-UCL	18261
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	21279
95% Adjusted-CLT UCL (Chen-1995)	19519 97.5% Chebyshev (MVUE) UCL	24054
95% Modified-t UCL (Johnson-1978)	18550 99% Chebyshev (MVUE) UCL	29504

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.38 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	2349	
MLE of Mean	14986	
MLE of Standard Deviation	5933	
nu star	153.1	
Approximate Chi Square Value (.05)	125.5 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	18039
Adjusted Chi Square Value	121.7 95% Jackknife UCL	18319
	95% Standard Bootstrap UCL	17903
Anderson-Darling Test Statistic	0.817 95% Bootstrap-t UCL	21569
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	31684
Kolmogorov-Smirnov Test Statistic	0.234 95% Percentile Bootstrap UCL	18235
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	19555
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	23075
	97.5% Chebyshev(Mean, Sd) UCL	26575
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	33450
95% Approximate Gamma UCL	18282	
95% Adjusted Gamma UCL	18855	

Potential UCL to Use Use 95% Approximate Gamma UCL 18282

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

Minimum	9.6	Minimum of Log Data	2.262
Maximum	88.92	Maximum of Log Data	4.488
Mean	62.99	Mean of log Data	4.045
Median	65	SD of log Data	0.579
SD	19.63		
Coefficient of Variation	0.312		
Skewness	-1.73		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.728	Shapiro Wilk Test Statistic	0.528
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.16	95% H-UCL	99.81
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	116.3
95% Adjusted-CLT UCL (Chen-1995)	69.28	97.5% Chebyshev (MVUE) UCL	137.9
95% Modified-t UCL (Johnson-1978)	72.69	99% Chebyshev (MVUE) UCL	180.3

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	4.002	Data Distribution	
Theta Star	15.74	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	62.99		
MLE of Standard Deviation	31.48		
nu star	96.05		
Approximate Chi Square Value (.05)	74.45	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	72.31
Adjusted Chi Square Value	71.55	95% Jackknife UCL	73.16
		95% Standard Bootstrap UCL	71.94
Anderson-Darling Test Statistic	2.194	95% Bootstrap-t UCL	70.63
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	70.47
Kolmogorov-Smirnov Test Statistic	0.383	95% Percentile Bootstrap UCL	70.72
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	69.72
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.69
		97.5% Chebyshev(Mean, Sd) UCL	98.38
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	119.4
95% Approximate Gamma UCL	81.26		
95% Adjusted Gamma UCL	84.56		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCI 87.69

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.029	Minimum of Log Data -3.54
Maximum	11.48	Maximum of Log Data 2.441
Mean	9.228	Mean of log Data 1.82
Median		10 SD of log Data 1.689
SD	2.94	
Coefficient of Variation	0.319	
Skewness	-3.28	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.448	Shapiro Wilk Test Statistic 0.347
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	10.75	Assuming Lognormal Distribution	95% H-UCL	228.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		68.19
95% Adjusted-CLT UCL (Chen-1995)	9.766	97.5% Chebyshev (MVUE) UCL		88.83
95% Modified-t UCL (Johnson-1978)	10.62	99% Chebyshev (MVUE) UCL		129.4

Gamma Distribution Test

k star (bias corrected)	1.096	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	8.418		
MLE of Mean	9.228		
MLE of Standard Deviation	8.814		
nu star	26.31		
Approximate Chi Square Value (.05)	15.62	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.62
Adjusted Chi Square Value	14.37	95% Jackknife UCL	10.75
		95% Standard Bootstrap UCL	10.54
Anderson-Darling Test Statistic	4.038	95% Bootstrap-t UCL	10.3
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	10.05
Kolmogorov-Smirnov Test Statistic	0.529	95% Percentile Bootstrap UCL	10.24
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	10.12
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.93
		97.5% Chebyshev(Mean, Sd) UCL	14.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.67
95% Approximate Gamma UCL	15.55		
95% Adjusted Gamma UCL	16.89		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCI 17.67

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-24.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	37.95	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.636
Mean	56.09	Maximum of Log Data	4.443
Median	42.85	Mean of log Data	3.965
SD	21.57	SD of log Data	0.36
Coefficient of Variation	0.385		
Skewness	0.745		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.696	Shapiro Wilk Test Statistic	0.726
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.27	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.74
95% Adjusted-CLT UCL (Chen-1995)	67.76	95% Chebyshev (MVUE) UCL	81.56
95% Modified-t UCL (Johnson-1978)	67.5	97.5% Chebyshev (MVUE) UCL	92.66
		99% Chebyshev (MVUE) UCL	114.5

Gamma Distribution Test

k star (bias corrected)	6.184	Data Distribution	
Theta Star	9.07	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	56.09		
MLE of Standard Deviation	22.56		
nu star	148.4		
Approximate Chi Square Value (.05)	121.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	66.33
Adjusted Chi Square Value	117.5	95% Jackknife UCL	67.27
		95% Standard Bootstrap UCL	66.05
Anderson-Darling Test Statistic	1.662	95% Bootstrap-t UCL	67.09
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	63.47
Kolmogorov-Smirnov Test Statistic	0.307	95% Percentile Bootstrap UCL	66.69
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	67.13
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	83.24
		97.5% Chebyshev(Mean, Sd) UCL	94.98
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	118.1
95% Approximate Gamma UCL	68.65		
95% Adjusted Gamma UCL	70.84		

Potential UCL to Use

Use 95% Student's-t UCL	67.27
or 95% Modified-t UCL	67.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	13.4 Minimum of Log Data	2.595
Maximum	84.13 Maximum of Log Data	4.432
Mean	62.29 Mean of log Data	4.064
Median	65 SD of log Data	0.469
SD	16.35	
Coefficient of Variation	0.262	
Skewness	-2.653	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.51 Shapiro Wilk Test Statistic	0.419
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	70.77 95% H-UCL	87.46
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	103.1
95% Adjusted-CLT UCL (Chen-1995)	66.2 97.5% Chebyshev (MVUE) UCL	119.8
95% Modified-t UCL (Johnson-1978)	70.17 99% Chebyshev (MVUE) UCL	152.7

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.727 Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.88	
MLE of Mean	62.29	
MLE of Standard Deviation	26.03	
nu star	137.4	
Approximate Chi Square Value (.05)	111.4 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	70.06
Adjusted Chi Square Value	107.8 95% Jackknife UCL	70.77
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.335 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.511 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	82.87
	97.5% Chebyshev(Mean, Sd) UCL	91.77
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	109.3
95% Approximate Gamma UCL	76.89	
95% Adjusted Gamma UCL	79.44	

Potential UCL to Use Use 95% Student's-t UCL 70.77
 or 95% Modified-t UCL 70.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-25.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Barium

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Barium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	39.22 Minimum of Log Data	3.669
Maximum	85 Maximum of Log Data	4.443
Mean	56.55 Mean of log Data	4.016
Median	56.55 SD of log Data	0.206
SD	12.13	
Coefficient of Variation	0.214	
Skewness	1.195	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.812 Shapiro Wilk Test Statistic	0.852
Shapiro Wilk Critical Value	0.842 Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	63.58 95% H-UCL	64.47
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	72.61
95% Adjusted-CLT UCL (Chen-1995)	64.41 97.5% Chebyshev (MVUE) UCL	79.57
95% Modified-t UCL (Johnson-1978)	63.82 99% Chebyshev (MVUE) UCL	93.24

Gamma Distribution Test

k star (bias corrected)	18.21 Data appear Lognormal at 5% Significance Level	
Theta Star	3.106	
MLE of Mean	56.55	
MLE of Standard Deviation	13.25	
nu star	364.2	
Approximate Chi Square Value (.05)	321 Nonparametric Statistics	
Adjusted Level of Significance	0.0267 95% CLT UCL	62.86
Adjusted Chi Square Value	313.9 95% Jackknife UCL	63.58
	95% Standard Bootstrap UCL	62.59
Anderson-Darling Test Statistic	0.918 95% Bootstrap-t UCL	65
Anderson-Darling 5% Critical Value	0.725 95% Hall's Bootstrap UCL	95.43
Kolmogorov-Smirnov Test Statistic	0.274 95% Percentile Bootstrap UCL	62.5
Kolmogorov-Smirnov 5% Critical Value	0.266 95% BCA Bootstrap UCL	64.19
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	73.27
	97.5% Chebyshev(Mean, Sd) UCL	80.5
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	94.71
95% Approximate Gamma UCL	64.17	
95% Adjusted Gamma UCL	65.61	

Potential UCL to Use Use 95% Student's-t UCL 63.58
 or 95% Modified-t UCL 63.82
 or 95% H-UCL 64.47

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics		
Number of Valid Observations	10	Number of Distinct Observations 6
Raw Statistics		
Minimum	161.9	Log-transformed Statistics Minimum of Log Data 5.087
Maximum	1800	Maximum of Log Data 7.496
Mean	543.8	Mean of log Data 6.055
Median	543.8	SD of log Data 0.706
SD	470.7	
Coefficient of Variation	0.866	
Skewness	2.45	
Relevant UCL Statistics		
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.665	Lognormal Distribution Test Shapiro Wilk Test Statistic 0.881
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value 0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
95% Student's-t UCL	816.6	Assuming Lognormal Distribution 95% H-UCL 995.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1065
95% Adjusted-CLT UCL (Chen-1995)	911.8	97.5% Chebyshev (MVUE) UCL 1296
95% Modified-t UCL (Johnson-1978)	835.8	99% Chebyshev (MVUE) UCL 1749
Gamma Distribution Test		
k star (bias corrected)	1.611	Data Distribution Data appear Lognormal at 5% Significance Level
Theta Star	337.6	
MLE of Mean	543.8	
MLE of Standard Deviation	428.5	
nu star	32.22	
Approximate Chi Square Value (.05)	20.24	Nonparametric Statistics
Adjusted Level of Significance	0.0267	95% CLT UCL 788.6
Adjusted Chi Square Value	18.61	95% Jackknife UCL 816.6
		95% Standard Bootstrap UCL 768.5
Anderson-Darling Test Statistic	0.777	95% Bootstrap-t UCL 1066
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL 1796
Kolmogorov-Smirnov Test Statistic	0.31	95% Percentile Bootstrap UCL 809
Kolmogorov-Smirnov 5% Critical Value	0.27	95% BCA Bootstrap UCL 883.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1193
		97.5% Chebyshev(Mean, Sd) UCL 1473
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2025
95% Approximate Gamma UCL	865.4	
95% Adjusted Gamma UCL	941.3	
Potential UCL to Use		Use 95% H-UCL 995.7

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	10 Minimum of Log Data	2.303
Maximum	65 Maximum of Log Data	4.174
Mean	53.66 Mean of log Data	3.889
Median	53.66 SD of log Data	0.565
SD	16.28	
Coefficient of Variation	0.303	
Skewness	-2.51	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.635 Shapiro Wilk Test Statistic	0.5
Shapiro Wilk Critical Value	0.842 Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	63.1 95% H-UCL	88.6
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	101.1
95% Adjusted-CLT UCL (Chen-1995)	57.77 97.5% Chebyshev (MVUE) UCL	120.5
95% Modified-t UCL (Johnson-1978)	62.42 99% Chebyshev (MVUE) UCL	158.6

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	3.904 Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.75	
MLE of Mean	53.66	
MLE of Standard Deviation	27.16	
nu star	78.08	
Approximate Chi Square Value (.05)	58.72 Nonparametric Statistics	
Adjusted Level of Significance	0.0267 95% CLT UCL	62.13
Adjusted Chi Square Value	55.81 95% Jackknife UCL	63.1
	95% Standard Bootstrap UCL	61.88
Anderson-Darling Test Statistic	2.082 95% Bootstrap-t UCL	60.26
Anderson-Darling 5% Critical Value	0.729 95% Hall's Bootstrap UCL	59.14
Kolmogorov-Smirnov Test Statistic	0.457 95% Percentile Bootstrap UCL	60.3
Kolmogorov-Smirnov 5% Critical Value	0.267 95% BCA Bootstrap UCL	59.16
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	76.1
	97.5% Chebyshev(Mean, Sd) UCL	85.81
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	104.9
95% Approximate Gamma UCL	71.35	
95% Adjusted Gamma UCL	75.07	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 76.1
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

10 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-26.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	14.6 Minimum of Log Data	2.681
Maximum	85 Maximum of Log Data	4.443
Mean	68.82 Mean of log Data	4.132
Median	85 SD of log Data	0.542
SD	24.36	
Coefficient of Variation	0.354	
Skewness	-1.376	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.724 Shapiro Wilk Test Statistic	0.661
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	81.45 95% H-UCL	103.3
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	121.1
95% Adjusted-CLT UCL (Chen-1995)	77.4 97.5% Chebyshev (MVUE) UCL	142.7
95% Modified-t UCL (Johnson-1978)	80.98 99% Chebyshev (MVUE) UCL	185.1

Gamma Distribution Test

k star (bias corrected)	3.936 Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.49	
MLE of Mean	68.82	
MLE of Standard Deviation	34.69	
nu star	94.46	
Approximate Chi Square Value (.05)	73.05 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	80.39
Adjusted Chi Square Value	70.18 95% Jackknife UCL	81.45
	95% Standard Bootstrap UCL	79.76
Anderson-Darling Test Statistic	1.69 95% Bootstrap-t UCL	79.19
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	77.36
Kolmogorov-Smirnov Test Statistic	0.323 95% Percentile Bootstrap UCL	79.61
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	77.79
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	99.47
	97.5% Chebyshev(Mean, Sd) UCL	112.7
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	138.8
95% Approximate Gamma UCL	89	
95% Adjusted Gamma UCL	92.64	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 99.47

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.046	Minimum of Log Data -3.079
Maximum	10.27	Maximum of Log Data 2.329
Mean	9.032	Mean of log Data 1.839
Median		10 SD of log Data 1.549
SD	2.857	
Coefficient of Variation	0.316	
Skewness	-3.352	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.421	Shapiro Wilk Test Statistic 0.345
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.51	95% H-UCL 135.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 54.84
95% Adjusted-CLT UCL (Chen-1995)	9.536	97.5% Chebyshev (MVUE) UCL 71
95% Modified-t UCL (Johnson-1978)	10.38	99% Chebyshev (MVUE) UCL 102.7

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.202	Data do not follow a Discernable Distribution (0.05)
Theta Star	7.512	
MLE of Mean	9.032	
MLE of Standard Deviation	8.237	
nu star	28.85	
Approximate Chi Square Value (.05)	17.59	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 10.39
Adjusted Chi Square Value	16.26	95% Jackknife UCL 10.51
		95% Standard Bootstrap UCL 10.32
Anderson-Darling Test Statistic	4.004	95% Bootstrap-t UCL 10.06
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL 9.839
Kolmogorov-Smirnov Test Statistic	0.524	95% Percentile Bootstrap UCL 9.964
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL 9.861
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 12.63
		97.5% Chebyshev(Mean, Sd) UCL 14.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 17.24
95% Approximate Gamma UCL	14.81	
95% Adjusted Gamma UCL	16.02	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.24
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-27.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	39.28	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.671
Mean	55.66	Maximum of Log Data	4.443
Median	52.04	Mean of log Data	3.992
SD	14.67	SD of log Data	0.237
Coefficient of Variation	0.264		
Skewness	1.46		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.784	Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.26	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	63.68
95% Adjusted-CLT UCL (Chen-1995)	64.53	95% Chebyshev (MVUE) UCL	72.25
95% Modified-t UCL (Johnson-1978)	63.56	97.5% Chebyshev (MVUE) UCL	79.47
		99% Chebyshev (MVUE) UCL	93.66

Gamma Distribution Test

k star (bias corrected)	13.76	Data Distribution	
Theta Star	4.046	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	55.66		
MLE of Standard Deviation	15.01		
nu star	330.1		
Approximate Chi Square Value (.05)	289	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	62.62
Adjusted Chi Square Value	283.2	95% Jackknife UCL	63.26
		95% Standard Bootstrap UCL	62.44
Anderson-Darling Test Statistic	0.913	95% Bootstrap-t UCL	71.36
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	114.5
Kolmogorov-Smirnov Test Statistic	0.302	95% Percentile Bootstrap UCL	63.11
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	64.49
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.11
		97.5% Chebyshev(Mean, Sd) UCL	82.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	97.79
95% Approximate Gamma UCL	63.57		
95% Adjusted Gamma UCL	64.89		

Potential UCL to Use

Use 95% Student's-t UCL	63.26
or 95% Modified-t UCL	63.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	11.6 Minimum of Log Data	2.451
Maximum	65.5 Maximum of Log Data	4.182
Mean	59.12 Mean of log Data	4.008
Median	65 SD of log Data	0.492
SD	15.2	
Coefficient of Variation	0.257	
Skewness	-3.283	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.449 Shapiro Wilk Test Statistic	0.388
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	67 95% H-UCL	85.2
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	100.3
95% Adjusted-CLT UCL (Chen-1995)	61.9 97.5% Chebyshev (MVUE) UCL	117.2
95% Modified-t UCL (Johnson-1978)	66.31 99% Chebyshev (MVUE) UCL	150.2

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.394 Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.96	
MLE of Mean	59.12	
MLE of Standard Deviation	25.46	
nu star	129.4	
Approximate Chi Square Value (.05)	104.2 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	66.34
Adjusted Chi Square Value	100.7 95% Jackknife UCL	67
	95% Standard Bootstrap UCL	66.06
Anderson-Darling Test Statistic	3.348 95% Bootstrap-t UCL	64.55
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	63.49
Kolmogorov-Smirnov Test Statistic	0.467 95% Percentile Bootstrap UCL	64.15
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	64.02
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	78.25
	97.5% Chebyshev(Mean, Sd) UCL	86.52
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	102.8
95% Approximate Gamma UCL	73.47	
95% Adjusted Gamma UCL	75.99	

Potential UCL to Use Use 95% Student's-t UCL 67
 or 95% Modified-t UCL 66.31

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics		Log-transformed Statistics	
Minimum	0.044	Minimum of Log Data	-3.124
Maximum	10.12	Maximum of Log Data	2.315
Mean	8.907	Mean of log Data	1.822
Median		10 SD of log Data	1.558
SD	2.835		
Coefficient of Variation	0.318		
Skewness	-3.282		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.45	Shapiro Wilk Test Statistic	0.351
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.38	95% H-UCL	137.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	54.74
95% Adjusted-CLT UCL (Chen-1995)	9.425	97.5% Chebyshev (MVUE) UCL	70.9
95% Modified-t UCL (Johnson-1978)	10.25	99% Chebyshev (MVUE) UCL	102.7

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.194	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.463		
MLE of Mean	8.907		
MLE of Standard Deviation	8.153		
nu star	28.65		
Approximate Chi Square Value (.05)	17.43	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.25
Adjusted Chi Square Value	16.11	95% Jackknife UCL	10.38
		95% Standard Bootstrap UCL	10.15
Anderson-Darling Test Statistic	3.883	95% Bootstrap-t UCL	9.913
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	9.717
Kolmogorov-Smirnov Test Statistic	0.524	95% Percentile Bootstrap UCL	9.838
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	9.737
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.47
		97.5% Chebyshev(Mean, Sd) UCL	14.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.05
95% Approximate Gamma UCL	14.64		
95% Adjusted Gamma UCL	15.84		

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	17.05
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-28.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	7.11	Log-transformed Statistics	
Maximum	14.8	Minimum of Log Data	1.962
Mean	10.92	Maximum of Log Data	2.695
Median	11	Mean of log Data	2.372
SD	2.128	SD of log Data	0.208
Coefficient of Variation	0.195		
Skewness	-0.197		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.8	Shapiro Wilk Test Statistic	0.774
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.03	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.3
95% Adjusted-CLT UCL (Chen-1995)	11.9	95% Chebyshev (MVUE) UCL	13.8
95% Modified-t UCL (Johnson-1978)	12.02	97.5% Chebyshev (MVUE) UCL	15.05
		99% Chebyshev (MVUE) UCL	17.48

Gamma Distribution Test

k star (bias corrected)	20.1	Data Distribution	
Theta Star	0.543	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.92		
MLE of Standard Deviation	2.436		
nu star	482.5		
Approximate Chi Square Value (.05)	432.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.93
Adjusted Chi Square Value	425.3	95% Jackknife UCL	12.03
		95% Standard Bootstrap UCL	11.86
Anderson-Darling Test Statistic	1.508	95% Bootstrap-t UCL	12
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	12.24
Kolmogorov-Smirnov Test Statistic	0.373	95% Percentile Bootstrap UCL	11.86
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.86
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.6
		97.5% Chebyshev(Mean, Sd) UCL	14.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.04
95% Approximate Gamma UCL	12.19		
95% Adjusted Gamma UCL	12.39		

Potential UCL to Use

Use 95% Student's-t UCL	12.03
or 95% Modified-t UCL	12.02

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	17.2 Minimum of Log Data	2.845
Maximum	85 Maximum of Log Data	4.443
Mean	50.02 Mean of log Data	3.831
Median	46.09 SD of log Data	0.437
SD	20.59	
Coefficient of Variation	0.412	
Skewness	0.663	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.885 Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	60.7 95% H-UCL	66.58
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	78.44
95% Adjusted-CLT UCL (Chen-1995)	61.02 97.5% Chebyshev (MVUE) UCL	90.62
95% Modified-t UCL (Johnson-1978)	60.89 99% Chebyshev (MVUE) UCL	114.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.759 Data appear Normal at 5% Significance Level	
Theta Star	10.51	
MLE of Mean	50.02	
MLE of Standard Deviation	22.93	
nu star	114.2	
Approximate Chi Square Value (.05)	90.54 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	59.8
Adjusted Chi Square Value	87.32 95% Jackknife UCL	60.7
	95% Standard Bootstrap UCL	59.34
Anderson-Darling Test Statistic	0.534 95% Bootstrap-t UCL	62.97
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	62.82
Kolmogorov-Smirnov Test Statistic	0.235 95% Percentile Bootstrap UCL	59.52
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	61.06
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	75.93
	97.5% Chebyshev(Mean, Sd) UCL	87.14
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	109.2
95% Approximate Gamma UCL	63.1	
95% Adjusted Gamma UCL	65.42	

Potential UCL to Use

Use 95% Student's-t UCL 60.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	149.4	Log-transformed Statistics	
Maximum	2400	Minimum of Log Data	5.006
Mean	678.5	Maximum of Log Data	7.783
Median	343.1	Mean of log Data	6.124
SD	686.2	SD of log Data	0.897
Coefficient of Variation	1.011		
Skewness	1.707		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.76	Shapiro Wilk Test Statistic	0.912
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1034	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1431
95% Adjusted-CLT UCL (Chen-1995)	1109	95% Chebyshev (MVUE) UCL	1437
95% Modified-t UCL (Johnson-1978)	1051	97.5% Chebyshev (MVUE) UCL	1776
		99% Chebyshev (MVUE) UCL	2442

Gamma Distribution Test

k star (bias corrected)	1.111	Data Distribution	
Theta Star	610.6	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	678.5		
MLE of Standard Deviation	643.7		
nu star	26.67		
Approximate Chi Square Value (.05)	15.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1004
Adjusted Chi Square Value	14.64	95% Jackknife UCL	1034
		95% Standard Bootstrap UCL	986.7
Anderson-Darling Test Statistic	0.736	95% Bootstrap-t UCL	1304
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	1136
Kolmogorov-Smirnov Test Statistic	0.285	95% Percentile Bootstrap UCL	1013
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	1088
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1542
		97.5% Chebyshev(Mean, Sd) UCL	1915
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2649
95% Approximate Gamma UCL	1138		
95% Adjusted Gamma UCL	1236		

Potential UCL to Use

Use 95% Approximate Gamma UCL 1138

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

Minimum	13.6	Minimum of Log Data	2.61
Maximum	69.74	Maximum of Log Data	4.245
Mean	61.57	Mean of log Data	4.057
Median	65	SD of log Data	0.456
SD	15.2		
Coefficient of Variation	0.247		
Skewness	-3.381		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.414	Shapiro Wilk Test Statistic	0.37
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.45	95% H-UCL	85.47
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	100.7
95% Adjusted-CLT UCL (Chen-1995)	64.21	97.5% Chebyshev (MVUE) UCL	116.8
95% Modified-t UCL (Johnson-1978)	68.73	99% Chebyshev (MVUE) UCL	148.5

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	6.091	Data Distribution	
Theta Star	10.11	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.57		
MLE of Standard Deviation	24.94		
nu star	146.2		
Approximate Chi Square Value (.05)	119.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	68.78
Adjusted Chi Square Value	115.5	95% Jackknife UCL	69.45
		95% Standard Bootstrap UCL	68.56
Anderson-Darling Test Statistic	3.629	95% Bootstrap-t UCL	67.03
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	65.77
Kolmogorov-Smirnov Test Statistic	0.524	95% Percentile Bootstrap UCL	66.51
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	66.17
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.7
		97.5% Chebyshev(Mean, Sd) UCL	88.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	105.2
95% Approximate Gamma UCL	75.48		
95% Adjusted Gamma UCL	77.9		

Potential UCL to Use

Use 95% Student's-t UCL 69.45
or 95% Modified-t UCL 68.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	10	Minimum of Log Data	2.303
Maximum	11.83	Maximum of Log Data	2.471
Mean	10.43	Mean of log Data	2.342
Median	10	SD of log Data	0.0645
SD	0.697		
Coefficient of Variation	0.0668		
Skewness	1.405		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.665	Shapiro Wilk Test Statistic	0.668
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.79	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.27
95% Adjusted-CLT UCL (Chen-1995)	10.84	97.5% Chebyshev (MVUE) UCL	11.64
95% Modified-t UCL (Johnson-1978)	10.8	99% Chebyshev (MVUE) UCL	12.36

Gamma Distribution Test

k star (bias corrected)	192.3	Data Distribution	
Theta Star	0.0542	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.43		
MLE of Standard Deviation	0.752		
nu star	4616		
Approximate Chi Square Value (.05)	4459	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.76
Adjusted Chi Square Value	4436	95% Jackknife UCL	10.79
		95% Standard Bootstrap UCL	10.74
Anderson-Darling Test Statistic	1.957	95% Bootstrap-t UCL	11.04
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10.85
Kolmogorov-Smirnov Test Statistic	0.407	95% Percentile Bootstrap UCL	10.78
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.84
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.3
		97.5% Chebyshev(Mean, Sd) UCL	11.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.43
95% Approximate Gamma UCL	10.79		
95% Adjusted Gamma UCL	10.85		

Potential UCL to Use

Use 95% Student's-t UCL 10.79
or 95% Modified-t UCL 10.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	194-30.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	9
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Raw Statistics

Minimum	37.64	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.628
Mean	57.92	Maximum of Log Data	4.443
Median	56.57	Mean of log Data	4.022
SD	16.9	SD of log Data	0.279
Coefficient of Variation	0.292		
Skewness	0.799		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.846	Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.27	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	67.6
95% Adjusted-CLT UCL (Chen-1995)	66.74	95% Chebyshev (MVUE) UCL	77.56
95% Modified-t UCL (Johnson-1978)	66.45	97.5% Chebyshev (MVUE) UCL	86.09
		99% Chebyshev (MVUE) UCL	102.8

Gamma Distribution Test

k star (bias corrected)	10.58	Data Distribution	
Theta Star	5.472	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	57.92		
MLE of Standard Deviation	17.8		
nu star	275.2		
Approximate Chi Square Value (.05)	237.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	65.63
Adjusted Chi Square Value	232.8	95% Jackknife UCL	66.27
		95% Standard Bootstrap UCL	65.26
Anderson-Darling Test Statistic	0.661	95% Bootstrap-t UCL	68.07
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	65.4
Kolmogorov-Smirnov Test Statistic	0.233	95% Percentile Bootstrap UCL	65.66
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	66.52
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.35
		97.5% Chebyshev(Mean, Sd) UCL	87.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.6
95% Approximate Gamma UCL	67.04		
95% Adjusted Gamma UCL	68.46		

Potential UCL to Use		Use 95% Approximate Gamma UCL	67.04
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	8.8	Minimum of Log Data	2.175
Maximum	10	Maximum of Log Data	2.303
Mean	9.88	Mean of log Data	2.29
Median		10 SD of log Data	0.035
SD	0.329		
Coefficient of Variation	0.0333		
Skewness	-3.452		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.414	Shapiro Wilk Test Statistic	0.408
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.04	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	9.937	95% Chebyshev (MVUE) UCL	10.3
95% Modified-t UCL (Johnson-1978)	10.03	97.5% Chebyshev (MVUE) UCL	10.48
		99% Chebyshev (MVUE) UCL	10.83

Gamma Distribution Test

k star (bias corrected)	703.7	Data Distribution	
Theta Star	0.014	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.88		
MLE of Standard Deviation	0.372		
nu star	18295		
Approximate Chi Square Value (.05)	17982	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.03
Adjusted Chi Square Value	17937	95% Jackknife UCL	10.04
		95% Standard Bootstrap UCL	N/A

Anderson-Darling Test Statistic	3.422	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.427	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.28
		97.5% Chebyshev(Mean, Sd) UCL	10.45
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.79
95% Approximate Gamma UCL	10.05		
95% Adjusted Gamma UCL	10.08		

Potential UCL to Use	Use 95% Student's-t UCL	10.04
	or 95% Modified-t UCL	10.03

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 7

Raw Statistics

Minimum	7.2	Minimum of Log Data	1.974
Maximum	69.87	Maximum of Log Data	4.247
Mean	59.47	Mean of log Data	3.987
Median	65	SD of log Data	0.607
SD	16.03		
Coefficient of Variation	0.269		
Skewness	-3.355		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.49	Shapiro Wilk Test Statistic	0.384
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.39	95% H-UCL	96
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	112.2
95% Adjusted-CLT UCL (Chen-1995)	62.36	97.5% Chebyshev (MVUE) UCL	133.2
95% Modified-t UCL (Johnson-1978)	66.7	99% Chebyshev (MVUE) UCL	174.4

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	4.087	Data Distribution	
Theta Star	14.55	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	59.47		
MLE of Standard Deviation	29.41		
nu star	106.3		
Approximate Chi Square Value (.05)	83.47	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	66.78
Adjusted Chi Square Value	80.59	95% Jackknife UCL	67.39
		95% Standard Bootstrap UCL	66.47
Anderson-Darling Test Statistic	3.519	95% Bootstrap-t UCL	64.95
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	63.82
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	64.9
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	64.28
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.84
		97.5% Chebyshev(Mean, Sd) UCL	87.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	103.7
95% Approximate Gamma UCL	75.7		
95% Adjusted Gamma UCL	78.4		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 78.84
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 5

Raw Statistics

Minimum	0.03	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.507
Mean	8.948	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.826
SD	2.716	SD of log Data	1.603
Coefficient of Variation	0.303		
Skewness	-3.444		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.431	Shapiro Wilk Test Statistic	0.332
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.29	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	140.9
95% Adjusted-CLT UCL (Chen-1995)	9.418	95% Chebyshev (MVUE) UCL	58.99
95% Modified-t UCL (Johnson-1978)	10.17	97.5% Chebyshev (MVUE) UCL	76.44
		99% Chebyshev (MVUE) UCL	110.7

Gamma Distribution Test

k star (bias corrected)	1.215	Data Distribution	
Theta Star	7.366	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.948		
MLE of Standard Deviation	8.119		
nu star	31.58		
Approximate Chi Square Value (.05)	19.74	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.19
Adjusted Chi Square Value	18.42	95% Jackknife UCL	10.29
		95% Standard Bootstrap UCL	10.16
Anderson-Darling Test Statistic	4.3	95% Bootstrap-t UCL	9.9
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	9.699
Kolmogorov-Smirnov Test Statistic	0.531	95% Percentile Bootstrap UCL	9.814
Kolmogorov-Smirnov 5% Critical Value	0.241	95% BCA Bootstrap UCL	9.733
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.23
		97.5% Chebyshev(Mean, Sd) UCL	13.65
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.44
95% Approximate Gamma UCL	14.32		
95% Adjusted Gamma UCL	15.34		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 16.44
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	200-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.3	Minimum of Log Data	-1.204
Maximum	0.56	Maximum of Log Data	-0.58
Mean	0.37	Mean of log Data	-0.999
Median	0.37	SD of log Data	0.0951
SD	0.0401		
Coefficient of Variation	0.108		
Skewness	3.572		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.382	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.387	95% Chebyshev (MVUE) UCL	0.398
95% Modified-t UCL (Johnson-1978)	0.383	97.5% Chebyshev (MVUE) UCL	0.41
		99% Chebyshev (MVUE) UCL	0.434

Gamma Distribution Test

k star (bias corrected)	95.11	Data Distribution	
Theta Star	0.00389	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.37		
MLE of Standard Deviation	0.0379		
nu star	5707		
Approximate Chi Square Value (.05)	5532	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	0.382
Adjusted Chi Square Value	5522	95% Jackknife UCL	0.382
		95% Standard Bootstrap UCL	0.382
Anderson-Darling Test Statistic	7.052	95% Bootstrap-t UCL	0.389
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.441
Kolmogorov-Smirnov Test Statistic	0.454	95% Percentile Bootstrap UCL	0.383
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	0.39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.402
		97.5% Chebyshev(Mean, Sd) UCL	0.416
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.443
95% Approximate Gamma UCL	0.382		
95% Adjusted Gamma UCL	0.382		

Potential UCL to Use

Use 95% Student's-t UCL	0.382
or 95% Modified-t UCL	0.383

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 18

Raw Statistics

Minimum	4.6	Minimum of Log Data	1.526
Maximum	11	Maximum of Log Data	2.398
Mean	9.094	Mean of log Data	2.179
Median	9.605	SD of log Data	0.254
SD	2.054		
Coefficient of Variation	0.226		
Skewness	-0.666		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.84	Shapiro Wilk Test Statistic	0.829
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.731	95% H-UCL	9.924
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.98
95% Adjusted-CLT UCL (Chen-1995)	9.662	97.5% Chebyshev (MVUE) UCL	11.78
95% Modified-t UCL (Johnson-1978)	9.723	99% Chebyshev (MVUE) UCL	13.37

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	15.85	Data Distribution	
Theta Star	0.574	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.094		
MLE of Standard Deviation	2.284		
nu star	950.9		
Approximate Chi Square Value (.05)	880.3	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	9.711
Adjusted Chi Square Value	876.4	95% Jackknife UCL	9.731
		95% Standard Bootstrap UCL	9.712
Anderson-Darling Test Statistic	1.897	95% Bootstrap-t UCL	9.683
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	9.655
Kolmogorov-Smirnov Test Statistic	0.217	95% Percentile Bootstrap UCL	9.656
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	9.672
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.73
		97.5% Chebyshev(Mean, Sd) UCL	11.44
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.82
95% Approximate Gamma UCL	9.823		
95% Adjusted Gamma UCL	9.867		

Potential UCL to Use

Use 95% Student's-t UCL 9.731
or 95% Modified-t UCL 9.723

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 4

Raw Statistics

Minimum	0.023	Log-transformed Statistics	
Maximum	0.9	Minimum of Log Data	-3.772
Mean	0.371	Maximum of Log Data	-0.105
Median	0.371	Mean of log Data	-1.077
SD	0.122	SD of log Data	0.549
Coefficient of Variation	0.33		
Skewness	2.019		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.419	Shapiro Wilk Test Statistic	0.353
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.409	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.485
95% Adjusted-CLT UCL (Chen-1995)	0.417	95% Chebyshev (MVUE) UCL	0.575
95% Modified-t UCL (Johnson-1978)	0.41	97.5% Chebyshev (MVUE) UCL	0.653
		99% Chebyshev (MVUE) UCL	0.807

Gamma Distribution Test

k star (bias corrected)	5.434	Data Distribution	
Theta Star	0.0683	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.371		
MLE of Standard Deviation	0.159		
nu star	326		
Approximate Chi Square Value (.05)	285.2	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	0.408
Adjusted Chi Square Value	283	95% Jackknife UCL	0.409
		95% Standard Bootstrap UCL	0.408
Anderson-Darling Test Statistic	8.597	95% Bootstrap-t UCL	0.416
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.481
Kolmogorov-Smirnov Test Statistic	0.488	95% Percentile Bootstrap UCL	0.406
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	0.424
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.468
		97.5% Chebyshev(Mean, Sd) UCL	0.51
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.593
95% Approximate Gamma UCL	0.424		
95% Adjusted Gamma UCL	0.427		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.468

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 23

Raw Statistics

Minimum	11.6	Minimum of Log Data	2.451
Maximum	85	Maximum of Log Data	4.443
Mean	52.88	Mean of log Data	3.836
Median	53.38	SD of log Data	0.577
SD	23.86		
Coefficient of Variation	0.451		
Skewness	-0.0121		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.905	Shapiro Wilk Test Statistic	0.86
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	60.28	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	67.92
95% Adjusted-CLT UCL (Chen-1995)	60.04	95% Chebyshev (MVUE) UCL	80.77
95% Modified-t UCL (Johnson-1978)	60.28	97.5% Chebyshev (MVUE) UCL	92.19
		99% Chebyshev (MVUE) UCL	114.6

Gamma Distribution Test

k star (bias corrected)	3.563	Data Distribution	
Theta Star	14.84	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	52.88		
MLE of Standard Deviation	28.01		
nu star	213.8		
Approximate Chi Square Value (.05)	180.9	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	60.05
Adjusted Chi Square Value	179.2	95% Jackknife UCL	60.28
		95% Standard Bootstrap UCL	59.95
Anderson-Darling Test Statistic	0.928	95% Bootstrap-t UCL	60.29
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	60
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	60.16
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	59.86
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	71.87
		97.5% Chebyshev(Mean, Sd) UCL	80.09
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	96.23
95% Approximate Gamma UCL	62.48		
95% Adjusted Gamma UCL	63.08		

Potential UCL to Use Use 95% Approximate Gamma UCL 62.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 30

Raw Statistics

Minimum	124.6	Log-transformed Statistics	
Maximum	1210	Minimum of Log Data	4.825
Mean	391.3	Maximum of Log Data	7.098
Median	366.9	Mean of log Data	5.846
SD	213.1	SD of log Data	0.504
Coefficient of Variation	0.545		
Skewness	1.991		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Test Statistic	0.983
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	457.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	471.5
95% Adjusted-CLT UCL (Chen-1995)	470.3	95% Chebyshev (MVUE) UCL	554.5
95% Modified-t UCL (Johnson-1978)	459.7	97.5% Chebyshev (MVUE) UCL	625.4
		99% Chebyshev (MVUE) UCL	764.5

Gamma Distribution Test

k star (bias corrected)	3.823	Data Distribution	
Theta Star	102.3	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	391.3		
MLE of Standard Deviation	200.1		
nu star	229.4		
Approximate Chi Square Value (.05)	195.3	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	455.2
Adjusted Chi Square Value	193.5	95% Jackknife UCL	457.3
		95% Standard Bootstrap UCL	453.7
Anderson-Darling Test Statistic	0.222	95% Bootstrap-t UCL	480.8
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	527.1
Kolmogorov-Smirnov Test Statistic	0.0777	95% Percentile Bootstrap UCL	460.2
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	469
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	560.8
		97.5% Chebyshev(Mean, Sd) UCL	634.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	778.3
95% Approximate Gamma UCL	459.5		
95% Adjusted Gamma UCL	463.8		

Potential UCL to Use Use 95% Approximate Gamma UCL 459.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 8

Raw Statistics

Minimum	0.0154	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.173
Mean	7.793	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.052
SD	4.031	SD of log Data	2.487
Coefficient of Variation	0.517		
Skewness	-1.455		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.553	Shapiro Wilk Test Statistic	0.518
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.043	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	558.6
95% Adjusted-CLT UCL (Chen-1995)	8.794	95% Chebyshev (MVUE) UCL	167.4
95% Modified-t UCL (Johnson-1978)	9.011	97.5% Chebyshev (MVUE) UCL	220.3
		99% Chebyshev (MVUE) UCL	324.4

Gamma Distribution Test

k star (bias corrected)	0.576	Data Distribution	
Theta Star	13.54	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.793		
MLE of Standard Deviation	10.27		
nu star	34.54		
Approximate Chi Square Value (.05)	22.1	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	9.003
Adjusted Chi Square Value	21.52	95% Jackknife UCL	9.043
		95% Standard Bootstrap UCL	8.967
Anderson-Darling Test Statistic	8.137	95% Bootstrap-t UCL	8.89
Anderson-Darling 5% Critical Value	0.799	95% Hall's Bootstrap UCL	8.766
Kolmogorov-Smirnov Test Statistic	0.468	95% Percentile Bootstrap UCL	8.893
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	8.791
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11
		97.5% Chebyshev(Mean, Sd) UCL	12.39
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.12
95% Approximate Gamma UCL	12.18		
95% Adjusted Gamma UCL	12.51		

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 12.39
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 23

Raw Statistics

Minimum	6.2	Minimum of Log Data	1.825
Maximum	259.5	Maximum of Log Data	5.559
Mean	78.45	Mean of log Data	4
Median	65	SD of log Data	1.008
SD	59.41		
Coefficient of Variation	0.757		
Skewness	1.372		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.833	Shapiro Wilk Test Statistic	0.822
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	96.88	95% H-UCL	144.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	170.4
95% Adjusted-CLT UCL (Chen-1995)	99.19	97.5% Chebyshev (MVUE) UCL	205.8
95% Modified-t UCL (Johnson-1978)	97.33	99% Chebyshev (MVUE) UCL	275.3

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	1.394	Data do not follow a Discernable Distribution (0.05)	
Theta Star	56.28		
MLE of Mean	78.45		
MLE of Standard Deviation	66.45		
nu star	83.63		
Approximate Chi Square Value (.05)	63.56	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	96.29
Adjusted Chi Square Value	62.55	95% Jackknife UCL	96.88
		95% Standard Bootstrap UCL	96.46
Anderson-Darling Test Statistic	1.83	95% Bootstrap-t UCL	101.7
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	102.3
Kolmogorov-Smirnov Test Statistic	2.78E-01	95% Percentile Bootstrap UCL	97.09
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	98.74
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	125.7
		97.5% Chebyshev(Mean, Sd) UCL	146.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	186.4
95% Approximate Gamma UCL	103.2		
95% Adjusted Gamma UCL	104.9		

Data Distribution

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 125.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 5

Raw Statistics

Minimum	0.3	Minimum of Log Data	-1.204
Maximum	5	Maximum of Log Data	1.609
Mean	4.161	Mean of log Data	1.308
Median	4.161	SD of log Data	0.672
SD	1.168		
Coefficient of Variation	0.281		
Skewness	-2.549		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.601	Shapiro Wilk Test Statistic	0.416
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.524	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.029
95% Adjusted-CLT UCL (Chen-1995)	4.406	95% Chebyshev (MVUE) UCL	7.236
95% Modified-t UCL (Johnson-1978)	4.507	97.5% Chebyshev (MVUE) UCL	8.379
		99% Chebyshev (MVUE) UCL	10.62

Gamma Distribution Test

k star (bias corrected)	3.992	Data Distribution	
Theta Star	1.042	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.161		
MLE of Standard Deviation	2.083		
nu star	239.5		
Approximate Chi Square Value (.05)	204.7	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	4.512
Adjusted Chi Square Value	202.9	95% Jackknife UCL	4.524
		95% Standard Bootstrap UCL	4.499
Anderson-Darling Test Statistic	6.528	95% Bootstrap-t UCL	4.443
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	4.431
Kolmogorov-Smirnov Test Statistic	0.463	95% Percentile Bootstrap UCL	4.482
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	4.43
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.091
		97.5% Chebyshev(Mean, Sd) UCL	5.493
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.282
95% Approximate Gamma UCL	4.869		
95% Adjusted Gamma UCL	4.914		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.091
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 8

Raw Statistics

Minimum	0.03	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.507
Mean	7.992	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.214
SD	4.042	SD of log Data	2.216
Coefficient of Variation	0.506		
Skewness	-1.578		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.497	Shapiro Wilk Test Statistic	0.506
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.245	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	228.5
95% Adjusted-CLT UCL (Chen-1995)	8.978	95% Chebyshev (MVUE) UCL	105.5
95% Modified-t UCL (Johnson-1978)	9.21	97.5% Chebyshev (MVUE) UCL	137.8
		99% Chebyshev (MVUE) UCL	201.2

Gamma Distribution Test

k star (bias corrected)	0.651	Data Distribution	
Theta Star	12.27	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.992		
MLE of Standard Deviation	9.901		
nu star	39.09		
Approximate Chi Square Value (.05)	25.77	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	9.205
Adjusted Chi Square Value	25.14	95% Jackknife UCL	9.245
		95% Standard Bootstrap UCL	9.154
Anderson-Darling Test Statistic	8.554	95% Bootstrap-t UCL	9.101
Anderson-Darling 5% Critical Value	0.792	95% Hall's Bootstrap UCL	9.013
Kolmogorov-Smirnov Test Statistic	0.507	95% Percentile Bootstrap UCL	9.005
Kolmogorov-Smirnov 5% Critical Value	0.167	95% BCA Bootstrap UCL	8.986
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.21
		97.5% Chebyshev(Mean, Sd) UCL	12.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.33
95% Approximate Gamma UCL	12.12		
95% Adjusted Gamma UCL	12.42		

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 12.6
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 3

Raw Statistics

Log-transformed Statistics

Minimum	0.0078	Minimum of Log Data	-4.854
Maximum	0.0284	Maximum of Log Data	-3.561
Mean	0.0181	Mean of log Data	-4.025
Median	0.0181	SD of log Data	0.177
SD	0.0027		
Coefficient of Variation	0.149		
Skewness	#####		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.362	Shapiro Wilk Test Statistic	0.333
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Lognormal Distribution

95% Student's-t UCL	0.0189	95% H-UCL	0.0192
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0207
95% Adjusted-CLT UCL (Chen-1995)	0.0189	97.5% Chebyshev (MVUE) UCL	0.0218
95% Modified-t UCL (Johnson-1978)	0.0189	99% Chebyshev (MVUE) UCL	0.024

Gamma Distribution Test

Data Distribution

k star (bias corrected)	34.67	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.22E-04		
MLE of Mean	0.0181		
MLE of Standard Deviation	0.00307		
nu star	2080		
Approximate Chi Square Value (.05)	1975	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	0.0189
Adjusted Chi Square Value	1969	95% Jackknife UCL	0.0189
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	9.522	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.488	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0203
		97.5% Chebyshev(Mean, Sd) UCL	0.0212
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.023
95% Approximate Gamma UCL	0.0191		
95% Adjusted Gamma UCL	0.0191		

Potential UCL to Use Use 95% Student's-t UCL 0.0189
 or 95% Modified-t UCL 0.0189

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 19

Raw Statistics

Minimum	0.91	Log-transformed Statistics	
Maximum	49.25	Minimum of Log Data	-0.0943
Mean	17.16	Maximum of Log Data	3.897
Median	20	Mean of log Data	2.53
SD	11.7	SD of log Data	0.965
Coefficient of Variation	0.682		
Skewness	1.224		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Test Statistic	0.82
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	20.79	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	30.93
95% Adjusted-CLT UCL (Chen-1995)	21.18	95% Chebyshev (MVUE) UCL	36.7
95% Modified-t UCL (Johnson-1978)	20.87	97.5% Chebyshev (MVUE) UCL	44.11
		99% Chebyshev (MVUE) UCL	58.68

Gamma Distribution Test

k star (bias corrected)	1.598	Data Distribution	
Theta Star	10.74	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	17.16		
MLE of Standard Deviation	13.57		
nu star	95.85		
Approximate Chi Square Value (.05)	74.27	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	20.67
Adjusted Chi Square Value	73.18	95% Jackknife UCL	20.79
		95% Standard Bootstrap UCL	20.56
Anderson-Darling Test Statistic	1.483	95% Bootstrap-t UCL	21.34
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	22.3
Kolmogorov-Smirnov Test Statistic	0.216	95% Percentile Bootstrap UCL	20.91
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	21.04
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	26.47
		97.5% Chebyshev(Mean, Sd) UCL	30.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	38.41
95% Approximate Gamma UCL	22.14		
95% Adjusted Gamma UCL	22.47		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 26.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	0.044 Minimum of Log Data	-3.124
Maximum	0.161 Maximum of Log Data	-1.826
Mean	0.109 Mean of log Data	-2.23
Median	0.109 SD of log Data	0.184
SD	0.0156	
Coefficient of Variation	0.144	
Skewness	-1.272	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.405 Shapiro Wilk Test Statistic	0.348
Shapiro Wilk Critical Value	0.927 Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.114	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.116
95% Adjusted-CLT UCL (Chen-1995)	0.113	95% Chebyshev (MVUE) UCL	0.125
95% Modified-t UCL (Johnson-1978)	0.114	97.5% Chebyshev (MVUE) UCL	0.132
		99% Chebyshev (MVUE) UCL	0.146

Gamma Distribution Test

k star (bias corrected)	33.55	Data Distribution	
Theta Star	0.00325	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.109		
MLE of Standard Deviation	0.0188		
nu star	2013		
Approximate Chi Square Value (.05)	1910	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	0.114
Adjusted Chi Square Value	1904	95% Jackknife UCL	0.114
		95% Standard Bootstrap UCL	0.114
Anderson-Darling Test Statistic	8.842	95% Bootstrap-t UCL	0.113
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	0.114
Kolmogorov-Smirnov Test Statistic	0.488	95% Percentile Bootstrap UCL	0.113
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	0.112
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.121
		97.5% Chebyshev(Mean, Sd) UCL	0.127
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.137
95% Approximate Gamma UCL	0.115		
95% Adjusted Gamma UCL	0.115		

Potential UCL to Use Use 95% Student's-t UCL 0.114
 or 95% Modified-t UCL 0.114

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.88	Minimum of Log Data	-0.128
Maximum	3.77	Maximum of Log Data	1.327
Mean	2.667	Mean of log Data	0.963
Median	2.667	SD of log Data	0.219
SD	0.41		
Coefficient of Variation	0.154		
Skewness	-2.165		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.42	Shapiro Wilk Test Statistic	0.338
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.794	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.883
95% Adjusted-CLT UCL (Chen-1995)	2.758	95% Chebyshev (MVUE) UCL	3.153
95% Modified-t UCL (Johnson-1978)	2.789	97.5% Chebyshev (MVUE) UCL	3.357
		99% Chebyshev (MVUE) UCL	3.757

Gamma Distribution Test

k star (bias corrected)	25.44	Data Distribution	
Theta Star	0.105	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.667		
MLE of Standard Deviation	0.529		
nu star	1526		
Approximate Chi Square Value (.05)	1437	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	2.79
Adjusted Chi Square Value	1432	95% Jackknife UCL	2.794
		95% Standard Bootstrap UCL	2.79
Anderson-Darling Test Statistic	8.669	95% Bootstrap-t UCL	2.765
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	2.783
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	2.786
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	2.749
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.993
		97.5% Chebyshev(Mean, Sd) UCL	3.134
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.412
95% Approximate Gamma UCL	2.833		
95% Adjusted Gamma UCL	2.843		

Potential UCL to Use	Use 95% Student's-t UCL	2.794
	or 95% Modified-t UCL	2.789

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	200-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Cesium-137

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.19	Log-transformed Statistics	
Maximum	0.9	Minimum of Log Data	-1.661
Mean	0.545	Maximum of Log Data	-0.105
Median	0.545	Mean of log Data	-0.625
SD	0.0932	SD of log Data	0.216
Coefficient of Variation	0.171		
Skewness	-9.49E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.362	Shapiro Wilk Test Statistic	0.324
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.574	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.588
95% Adjusted-CLT UCL (Chen-1995)	0.573	95% Chebyshev (MVUE) UCL	0.642
95% Modified-t UCL (Johnson-1978)	0.574	97.5% Chebyshev (MVUE) UCL	0.683
		99% Chebyshev (MVUE) UCL	0.764

Gamma Distribution Test

k star (bias corrected)	24.62	Data Distribution	
Theta Star	0.0221	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.545		
MLE of Standard Deviation	0.11		
nu star	1477		
Approximate Chi Square Value (.05)	1389	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	0.573
Adjusted Chi Square Value	1384	95% Jackknife UCL	0.574
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	9.543	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.619
		97.5% Chebyshev(Mean, Sd) UCL	0.651
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.714
95% Approximate Gamma UCL	0.58		
95% Adjusted Gamma UCL	0.582		

Potential UCL to Use		Use 95% Student's-t UCL	0.574
		or 95% Modified-t UCL	0.574

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 12

Raw Statistics

Minimum	12.4	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.518
Mean	69.64	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.168
SD	22.06	SD of log Data	0.451
Coefficient of Variation	0.317		
Skewness	-1.069		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.714	Shapiro Wilk Test Statistic	0.674
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	76.48	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	83.87
95% Adjusted-CLT UCL (Chen-1995)	75.42	95% Chebyshev (MVUE) UCL	97.66
95% Modified-t UCL (Johnson-1978)	76.35	97.5% Chebyshev (MVUE) UCL	109.1
		99% Chebyshev (MVUE) UCL	131.6

Gamma Distribution Test

k star (bias corrected)	6.13	Data Distribution	
Theta Star	11.36	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	69.64		
MLE of Standard Deviation	28.12		
nu star	367.8	Nonparametric Statistics	
Approximate Chi Square Value (.05)	324.4	95% CLT UCL	76.26
Adjusted Level of Significance	0.041	95% Jackknife UCL	76.48
Adjusted Chi Square Value	322	95% Standard Bootstrap UCL	76.09
Anderson-Darling Test Statistic	3.839	95% Bootstrap-t UCL	75.51
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	75.25
Kolmogorov-Smirnov Test Statistic	0.38	95% Percentile Bootstrap UCL	76.19
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	75.48
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.19
		97.5% Chebyshev(Mean, Sd) UCL	94.79
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	109.7
95% Approximate Gamma UCL	78.96		
95% Adjusted Gamma UCL	79.54		

Potential UCL to Use

Use 95% Student's-t UCL 76.48
or 95% Modified-t UCL 76.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 3

Raw Statistics

Minimum	0.0168	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.086
Mean	9.558	Maximum of Log Data	2.303
Median	10	Mean of log Data	2.076
SD	1.899	SD of log Data	1.166
Coefficient of Variation	0.199		
Skewness	-4.794		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.26	Shapiro Wilk Test Statistic	0.204
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	28.21
95% Adjusted-CLT UCL (Chen-1995)	9.804	95% Chebyshev (MVUE) UCL	31.93
95% Modified-t UCL (Johnson-1978)	10.1	97.5% Chebyshev (MVUE) UCL	39.18
		99% Chebyshev (MVUE) UCL	53.41

Gamma Distribution Test

k star (bias corrected)	2.649	Data Distribution	
Theta Star	3.608	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.558		
MLE of Standard Deviation	5.873		
nu star	158.9		
Approximate Chi Square Value (.05)	130.8	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	10.13
Adjusted Chi Square Value	129.3	95% Jackknife UCL	10.15
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	10.84	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.541	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.07
		97.5% Chebyshev(Mean, Sd) UCL	11.72
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.01
95% Approximate Gamma UCL	11.61		
95% Adjusted Gamma UCL	11.75		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.07
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	15
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Raw Statistics

Minimum	10.8	Log-transformed Statistics	
Maximum	259.5	Minimum of Log Data	2.38
Mean	87.01	Maximum of Log Data	5.559
Median	65	Mean of log Data	4.328
SD	51.45	SD of log Data	0.547
Coefficient of Variation	0.591		
Skewness	2.028		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.672	Shapiro Wilk Test Statistic	0.725
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	103	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	107.8
95% Adjusted-CLT UCL (Chen-1995)	106.2	95% Chebyshev (MVUE) UCL	127.6
95% Modified-t UCL (Johnson-1978)	103.5	97.5% Chebyshev (MVUE) UCL	145
		99% Chebyshev (MVUE) UCL	179.1

Gamma Distribution Test

k star (bias corrected)	3.423	Data Distribution	
Theta Star	25.42	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	87.01		
MLE of Standard Deviation	47.03		
nu star	205.4		
Approximate Chi Square Value (.05)	173.2	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	102.5
Adjusted Chi Square Value	171.5	95% Jackknife UCL	103
		95% Standard Bootstrap UCL	101.9
Anderson-Darling Test Statistic	3.936	95% Bootstrap-t UCL	109.3
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	106.9
Kolmogorov-Smirnov Test Statistic	0.318	95% Percentile Bootstrap UCL	102.6
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	107.2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	128
		97.5% Chebyshev(Mean, Sd) UCL	145.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	180.5
95% Approximate Gamma UCL	103.2		
95% Adjusted Gamma UCL	104.2		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	128
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 4

Raw Statistics

Minimum	0.3	Log-transformed Statistics	
Maximum	5	Minimum of Log Data	-1.204
Mean	4.493	Maximum of Log Data	1.609
Median	4.493	Mean of log Data	1.437
SD	0.914	SD of log Data	0.513
Coefficient of Variation	0.204		
Skewness	-3.814		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.48	Shapiro Wilk Test Statistic	0.31
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.777	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	5.785
95% Adjusted-CLT UCL (Chen-1995)	4.643	95% Chebyshev (MVUE) UCL	6.815
95% Modified-t UCL (Johnson-1978)	4.757	97.5% Chebyshev (MVUE) UCL	7.698
		99% Chebyshev (MVUE) UCL	9.431

Gamma Distribution Test

k star (bias corrected)	7.021	Data Distribution	
Theta Star	0.64	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.493		
MLE of Standard Deviation	1.696		
nu star	421.3		
Approximate Chi Square Value (.05)	374.7	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	4.767
Adjusted Chi Square Value	372.2	95% Jackknife UCL	4.777
		95% Standard Bootstrap UCL	4.765
Anderson-Darling Test Statistic	7.405	95% Bootstrap-t UCL	4.699
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	4.676
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	4.73
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	4.696
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.221
		97.5% Chebyshev(Mean, Sd) UCL	5.535
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.154
95% Approximate Gamma UCL	5.051		
95% Adjusted Gamma UCL	5.086		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.221
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

30 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 16

Raw Statistics

Minimum	6.62	Log-transformed Statistics	
Maximum	49.25	Minimum of Log Data	1.89
Mean	19.04	Maximum of Log Data	3.897
Median	20	Mean of log Data	2.816
SD	10.38	SD of log Data	0.524
Coefficient of Variation	0.545		
Skewness	1.574		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.766	Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	22.26	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	23.23
95% Adjusted-CLT UCL (Chen-1995)	22.74	95% Chebyshev (MVUE) UCL	27.41
95% Modified-t UCL (Johnson-1978)	22.35	97.5% Chebyshev (MVUE) UCL	31.02
		99% Chebyshev (MVUE) UCL	38.12

Gamma Distribution Test

k star (bias corrected)	3.606	Data Distribution	
Theta Star	5.28	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	19.04		
MLE of Standard Deviation	10.03		
nu star	216.4	Nonparametric Statistics	
Approximate Chi Square Value (.05)	183.3	95% CLT UCL	22.16
Adjusted Level of Significance	0.041	95% Jackknife UCL	22.26
Adjusted Chi Square Value	181.6	95% Standard Bootstrap UCL	22.15
Anderson-Darling Test Statistic	2.127	95% Bootstrap-t UCL	23.66
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	24.69
Kolmogorov-Smirnov Test Statistic	0.262	95% Percentile Bootstrap UCL	22.34
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	22.36
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27.3
		97.5% Chebyshev(Mean, Sd) UCL	30.87
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	37.89
95% Approximate Gamma UCL	22.47		
95% Adjusted Gamma UCL	22.69		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 27.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 30 Number of Distinct Observations 3

Raw Statistics

Minimum	0.122	Log-transformed Statistics	
Maximum	0.161	Minimum of Log Data	-2.104
Mean	0.142	Maximum of Log Data	-1.826
Median	0.142	Mean of log Data	-1.956
SD	0.00512	SD of log Data	0.0365
Coefficient of Variation	0.0362		
Skewness	-4.36E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.362	Shapiro Wilk Test Statistic	0.36
Shapiro Wilk Critical Value	0.927	Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.143	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.143	95% Chebyshev (MVUE) UCL	0.146
95% Modified-t UCL (Johnson-1978)	0.143	97.5% Chebyshev (MVUE) UCL	0.147
		99% Chebyshev (MVUE) UCL	0.151

Gamma Distribution Test

k star (bias corrected)	704.2	Data Distribution	
Theta Star	2.01E-04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.142		
MLE of Standard Deviation	0.00533		
nu star	42255		
Approximate Chi Square Value (.05)	41778	Nonparametric Statistics	
Adjusted Level of Significance	0.041	95% CLT UCL	0.143
Adjusted Chi Square Value	41751	95% Jackknife UCL	0.143
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	9.474	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.146
		97.5% Chebyshev(Mean, Sd) UCL	0.147
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.151
95% Approximate Gamma UCL	0.143		
95% Adjusted Gamma UCL	0.143		

Potential UCL to Use Use 95% Student's-t UCL 0.143
 or 95% Modified-t UCL 0.143

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	217-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	5	Minimum of Log Data	1.609
Maximum	11	Maximum of Log Data	2.398
Mean	8.446	Mean of log Data	2.106
Median	8.34	SD of log Data	0.248
SD	1.975		
Coefficient of Variation	0.234		
Skewness	-0.202		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.939	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.423	95% H-UCL	9.691
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.01
95% Adjusted-CLT UCL (Chen-1995)	9.314	97.5% Chebyshev (MVUE) UCL	12.12
95% Modified-t UCL (Johnson-1978)	9.417	99% Chebyshev (MVUE) UCL	14.29

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	14.27	Data appear Normal at 5% Significance Level	
Theta Star	0.592		
MLE of Mean	8.446		
MLE of Standard Deviation	2.236		
nu star	371.1		
Approximate Chi Square Value (.05)	327.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.347
Adjusted Chi Square Value	321.6	95% Jackknife UCL	9.423
		95% Standard Bootstrap UCL	9.327
Anderson-Darling Test Statistic	0.367	95% Bootstrap-t UCL	9.346
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	9.308
Kolmogorov-Smirnov Test Statistic	0.164	95% Percentile Bootstrap UCL	9.29
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	9.329
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.83
		97.5% Chebyshev(Mean, Sd) UCL	11.87
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.9
95% Approximate Gamma UCL	9.572		
95% Adjusted Gamma UCL	9.746		

Potential UCL to Use

		Use 95% Student's-t UCL	9.423
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	39.6	Minimum of Log Data	3.679
Maximum	88.9	Maximum of Log Data	4.488
Mean	56.49	Mean of log Data	3.993
Median	53.32	SD of log Data	0.288
SD	17.83		
Coefficient of Variation	0.316		
Skewness	1.11		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.84
Shapiro Wilk Test Statistic	0.785	Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	0.866	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	65.3	95% H-UCL	66.21
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	76.16
95% Adjusted-CLT UCL (Chen-1995)	66.25	97.5% Chebyshev (MVUE) UCL	84.73
95% Modified-t UCL (Johnson-1978)	65.56	99% Chebyshev (MVUE) UCL	101.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.624	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.87		
MLE of Mean	56.49		
MLE of Standard Deviation	18.21		
nu star	250.2		
Approximate Chi Square Value (.05)	214.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	64.62
Adjusted Chi Square Value	209.9	95% Jackknife UCL	65.3
		95% Standard Bootstrap UCL	64.29
Anderson-Darling Test Statistic	1.027	95% Bootstrap-t UCL	68.06
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	63.84
Kolmogorov-Smirnov Test Statistic	0.29	95% Percentile Bootstrap UCL	64.49
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	66.76
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.05
		97.5% Chebyshev(Mean, Sd) UCL	87.37
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	105.7
95% Approximate Gamma UCL	65.87		
95% Adjusted Gamma UCL	67.34		

Potential UCL to Use

Use 95% Student's-t UCL 65.3
or 95% Modified-t UCL 65.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	7.2	Minimum of Log Data	1.974
Maximum	25	Maximum of Log Data	3.219
Mean	14.53	Mean of log Data	2.645
Median	14.53	SD of log Data	0.264
SD	3.799		
Coefficient of Variation	0.261		
Skewness	1.296		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.647	Shapiro Wilk Test Statistic	0.671
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16.41	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16.83
95% Adjusted-CLT UCL (Chen-1995)	16.67	95% Chebyshev (MVUE) UCL	19.22
95% Modified-t UCL (Johnson-1978)	16.47	97.5% Chebyshev (MVUE) UCL	21.24
		99% Chebyshev (MVUE) UCL	25.21

Gamma Distribution Test

k star (bias corrected)	12.59	Data Distribution	
Theta Star	1.154	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	14.53		
MLE of Standard Deviation	4.096		
nu star	327.4		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301	Nonparametric Statistics	
Adjusted Chi Square Value	281	95% CLT UCL	16.27
		95% Jackknife UCL	16.41
		95% Standard Bootstrap UCL	16.23
Anderson-Darling Test Statistic	2.361	95% Bootstrap-t UCL	16.69
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	19.49
Kolmogorov-Smirnov Test Statistic	0.39	95% Percentile Bootstrap UCL	16.14
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	16.38
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	19.13
		97.5% Chebyshev(Mean, Sd) UCL	21.11
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	25.02
95% Approximate Gamma UCL	16.61		
95% Adjusted Gamma UCL	16.93		

Potential UCL to Use

Use 95% Student's-t UCL	16.41
or 95% Modified-t UCL	16.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Manganese

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	155.6	Minimum of Log Data	5.047
Maximum	1956	Maximum of Log Data	7.579
Mean	653.1	Mean of log Data	6.185
Median	401.3	SD of log Data	0.784
SD	564.5		
Coefficient of Variation	0.864		
Skewness	1.536		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	932.1	95% H-UCL	1162
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1284
95% Adjusted-CLT UCL (Chen-1995)	981.9	97.5% Chebyshev (MVUE) UCL	1562
95% Modified-t UCL (Johnson-1978)	943.3	99% Chebyshev (MVUE) UCL	2107

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.464	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	446.2		
MLE of Mean	653.1		
MLE of Standard Deviation	539.8		
nu star	38.05		
Approximate Chi Square Value (.05)	24.93	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	910.6
Adjusted Chi Square Value	23.42	95% Jackknife UCL	932.1
		95% Standard Bootstrap UCL	896.8
Anderson-Darling Test Statistic	0.444	95% Bootstrap-t UCL	1133
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	1296
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	908.8
Kolmogorov-Smirnov 5% Critical Value	0.24	95% BCA Bootstrap UCL	961.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1336
		97.5% Chebyshev(Mean, Sd) UCL	1631
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2211
95% Approximate Gamma UCL	997		
95% Adjusted Gamma UCL	1061		

Potential UCL to Use Use 95% Approximate Gamma UCL 997

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0101	Minimum of Log Data	-4.595
Maximum	10	Maximum of Log Data	2.303
Mean	8.029	Mean of log Data	1.24
Median	10	SD of log Data	2.454
SD	3.708		
Coefficient of Variation	0.462		
Skewness	-1.859		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.484
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.862	95% H-UCL	4183
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	157.5
95% Adjusted-CLT UCL (Chen-1995)	9.154	97.5% Chebyshev (MVUE) UCL	209.3
95% Modified-t UCL (Johnson-1978)	9.774	99% Chebyshev (MVUE) UCL	311.2

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.601	Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.36		
MLE of Mean	8.029		
MLE of Standard Deviation	10.36		
nu star	15.62		
Approximate Chi Square Value (.05)	7.697	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.721
Adjusted Chi Square Value	6.918	95% Jackknife UCL	9.862
		95% Standard Bootstrap UCL	9.698
Anderson-Darling Test Statistic	3.667	95% Bootstrap-t UCL	9.4
Anderson-Darling 5% Critical Value	0.773	95% Hall's Bootstrap UCL	9.253
Kolmogorov-Smirnov Test Statistic	0.459	95% Percentile Bootstrap UCL	9.565
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	9.232
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.51
		97.5% Chebyshev(Mean, Sd) UCL	14.45
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.26
95% Approximate Gamma UCL	16.3		
95% Adjusted Gamma UCL	18.13		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.26
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	11.4	Minimum of Log Data	2.434
Maximum	130.4	Maximum of Log Data	4.871
Mean	70.92	Mean of log Data	4.115
Median	65	SD of log Data	0.649
SD	32.7		
Coefficient of Variation	0.461		
Skewness	0.154		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Test Statistic	0.784
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	87.08	95% H-UCL	116.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	134.9
95% Adjusted-CLT UCL (Chen-1995)	86.25	97.5% Chebyshev (MVUE) UCL	161.2
95% Modified-t UCL (Johnson-1978)	87.15	99% Chebyshev (MVUE) UCL	212.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.805	Data appear Normal at 5% Significance Level	
Theta Star	25.28		
MLE of Mean	70.92		
MLE of Standard Deviation	42.34		
nu star	72.93		
Approximate Chi Square Value (.05)	54.27	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	85.84
Adjusted Chi Square Value	51.98	95% Jackknife UCL	87.08
		95% Standard Bootstrap UCL	85.14
Anderson-Darling Test Statistic	1.013	95% Bootstrap-t UCL	88.22
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	90.33
Kolmogorov-Smirnov Test Statistic	0.321	95% Percentile Bootstrap UCL	85.45
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	85.46
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	110.5
		97.5% Chebyshev(Mean, Sd) UCL	127.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	161.2
95% Approximate Gamma UCL	95.31		
95% Adjusted Gamma UCL	99.51		

Potential UCL to Use

Use 95% Student's-t UCL 87.08

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.016	Minimum of Log Data	-4.135
Maximum	13.45	Maximum of Log Data	2.599
Mean	8.097	Mean of log Data	0.907
Median	10	SD of log Data	2.743
SD	4.714		
Coefficient of Variation	0.582		
Skewness	-1.244		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.684	Shapiro Wilk Test Statistic	0.569
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.43	95% H-UCL	16757
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	200.5
95% Adjusted-CLT UCL (Chen-1995)	9.766	97.5% Chebyshev (MVUE) UCL	267.7
95% Modified-t UCL (Johnson-1978)	10.35	99% Chebyshev (MVUE) UCL	399.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.46	Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.61		
MLE of Mean	8.097		
MLE of Standard Deviation	11.94		
nu star	11.96		
Approximate Chi Square Value (.05)	5.198	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.25
Adjusted Chi Square Value	4.579	95% Jackknife UCL	10.43
		95% Standard Bootstrap UCL	10.18
Anderson-Darling Test Statistic	3.234	95% Bootstrap-t UCL	10.18
Anderson-Darling 5% Critical Value	0.788	95% Hall's Bootstrap UCL	9.739
Kolmogorov-Smirnov Test Statistic	0.5	95% Percentile Bootstrap UCL	10.03
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	9.763
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.8
		97.5% Chebyshev(Mean, Sd) UCL	16.26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.11
95% Approximate Gamma UCL	18.62		
95% Adjusted Gamma UCL	21.14		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 21.11

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.92	Minimum of Log Data -0.083
Maximum	1.27	Maximum of Log Data 0.239
Mean	1.057	Mean of log Data 0.0528
Median	1.057	SD of log Data 0.0699
SD	0.0764	
Coefficient of Variation	0.0723	
Skewness	1.48	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.648	Shapiro Wilk Test Statistic 0.668
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value 0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.094	95% H-UCL N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1.146
95% Adjusted-CLT UCL (Chen-1995)	1.101	97.5% Chebyshev (MVUE) UCL 1.185
95% Modified-t UCL (Johnson-1978)	1.096	99% Chebyshev (MVUE) UCL 1.261

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	167.3	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0063	
MLE of Mean	1.057	
MLE of Standard Deviation	0.0817	
nu star	4349	
Approximate Chi Square Value (.05)	4197	Nonparametric Statistics
Adjusted Level of Significance	0.0301	95% CLT UCL 1.092
Adjusted Chi Square Value	4175	95% Jackknife UCL 1.094
		95% Standard Bootstrap UCL 1.091
Anderson-Darling Test Statistic	2.361	95% Bootstrap-t UCL 1.103
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL 1.302
Kolmogorov-Smirnov Test Statistic	0.414	95% Percentile Bootstrap UCL 1.091
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL 1.095
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.149
		97.5% Chebyshev(Mean, Sd) UCL 1.189
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 1.268
95% Approximate Gamma UCL	1.095	
95% Adjusted Gamma UCL	1.101	

Potential UCL to Use Use 95% Student's-t UCL 1.094
 or 95% Modified-t UCL 1.096

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Vanadium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	16.3	Minimum of Log Data	2.791
Maximum	43.8	Maximum of Log Data	3.78
Mean	27.03	Mean of log Data	3.276
Median	27.03	SD of log Data	0.213
SD	6.005		
Coefficient of Variation	0.222		
Skewness	1.481		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.648	Shapiro Wilk Test Statistic	0.689
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	30	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	30.33
95% Adjusted-CLT UCL (Chen-1995)	30.5	95% Chebyshev (MVUE) UCL	34.04
95% Modified-t UCL (Johnson-1978)	30.12	97.5% Chebyshev (MVUE) UCL	37.07
		99% Chebyshev (MVUE) UCL	43.03

Gamma Distribution Test

k star (bias corrected)	18.3	Data Distribution	
Theta Star	1.477	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	27.03		
MLE of Standard Deviation	6.319		
nu star	475.8		
Approximate Chi Square Value (.05)	426.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	29.77
Adjusted Chi Square Value	419.6	95% Jackknife UCL	30
		95% Standard Bootstrap UCL	29.66
Anderson-Darling Test Statistic	2.309	95% Bootstrap-t UCL	30.68
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	46.31
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL	29.61
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	30.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	34.29
		97.5% Chebyshev(Mean, Sd) UCL	37.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	43.6
95% Approximate Gamma UCL	30.18		
95% Adjusted Gamma UCL	30.66		

Potential UCL to Use
Use 95% Student's-t UCL 30
or 95% Modified-t UCL 30.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	217-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

1,1-Dichloroethene

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	4
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.006 Minimum of Log Data	-5.12
Maximum	0.03 Maximum of Log Data	-3.51
Mean	0.017 Mean of log Data	-4.11
Median	0.017 SD of log Data	0.296
SD	0.0043	
Coefficient of Variation	0.252	
Skewness	0.772	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.538 Shapiro Wilk Test Statistic	0.504
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.0188 95% H-UCL	0.02
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.023
95% Adjusted-CLT UCL (Chen-1995)	0.0189 97.5% Chebyshev (MVUE) UCL	0.025
95% Modified-t UCL (Johnson-1978)	0.0188 99% Chebyshev (MVUE) UCL	0.03

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	11.87 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0014	
MLE of Mean	0.017	
MLE of Standard Deviation	0.0049	
nu star	403.5	
Approximate Chi Square Value (.05)	358 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	0.019
Adjusted Chi Square Value	353.5 95% Jackknife UCL	0.019
	95% Standard Bootstrap UCL	0.019
Anderson-Darling Test Statistic	4.091 95% Bootstrap-t UCL	0.019
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	0.02
Kolmogorov-Smirnov Test Statistic	0.417 95% Percentile Bootstrap UCL	0.019
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	0.019
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.022
	97.5% Chebyshev(Mean, Sd) UCL	0.024
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.027
95% Approximate Gamma UCL	0.0192	
95% Adjusted Gamma UCL	0.0194	

Potential UCL to Use
 Use 95% Student's-t UCL 0.019
 or 95% Modified-t UCL 0.019

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Aluminum

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	3260 Minimum of Log Data	8.089
Maximum	14400 Maximum of Log Data	9.575
Mean	9147 Mean of log Data	9.076
Median	9147 SD of log Data	0.331
SD	2569	
Coefficient of Variation	0.281	
Skewness	-0.041	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.854 Shapiro Wilk Test Statistic	0.784
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10235 95% H-UCL	10801
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12483
95% Adjusted-CLT UCL (Chen-1995)	10165 97.5% Chebyshev (MVUE) UCL	13900
95% Modified-t UCL (Johnson-1978)	10234 99% Chebyshev (MVUE) UCL	16685

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	9.329 Data do not follow a Discernable Distribution (0.05)	
Theta Star	980.5	
MLE of Mean	9147	
MLE of Standard Deviation	2995	
nu star	317.2	
Approximate Chi Square Value (.05)	276.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	10172
Adjusted Chi Square Value	273 95% Jackknife UCL	10235
	95% Standard Bootstrap UCL	10146
Anderson-Darling Test Statistic	1.565 95% Bootstrap-t UCL	10274
Anderson-Darling 5% Critical Value	0.739 95% Hall's Bootstrap UCL	10313
Kolmogorov-Smirnov Test Statistic	0.304 95% Percentile Bootstrap UCL	10142
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	10186
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11863
	97.5% Chebyshev(Mean, Sd) UCL	13038
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	15346
95% Approximate Gamma UCL	10477	
95% Adjusted Gamma UCL	10628	

Potential UCL to Use

Use 95% Student's-t UCL 10235
or 95% Modified-t UCL 10234

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	0.39 Minimum of Log Data	-0.94
Maximum	20 Maximum of Log Data	2.996
Mean	4.066 Mean of log Data	1.012
Median	4.066 SD of log Data	0.972
SD	4.353	
Coefficient of Variation	1.071	
Skewness	3.333	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53 Shapiro Wilk Test Statistic	0.792
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	5.909 95% H-UCL	8.355
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	9.044
95% Adjusted-CLT UCL (Chen-1995)	6.714 97.5% Chebyshev (MVUE) UCL	11.12
95% Modified-t UCL (Johnson-1978)	6.051 99% Chebyshev (MVUE) UCL	15.2

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.211 Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.358	
MLE of Mean	4.066	
MLE of Standard Deviation	3.695	
nu star	41.16	
Approximate Chi Square Value (.05)	27.46 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	5.802
Adjusted Chi Square Value	26.29 95% Jackknife UCL	5.909
	95% Standard Bootstrap UCL	5.712
Anderson-Darling Test Statistic	1.83 95% Bootstrap-t UCL	7.824
Anderson-Darling 5% Critical Value	0.757 95% Hall's Bootstrap UCL	13.26
Kolmogorov-Smirnov Test Statistic	0.33 95% Percentile Bootstrap UCL	5.985
Kolmogorov-Smirnov 5% Critical Value	0.213 95% BCA Bootstrap UCL	7.271
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	8.668
	97.5% Chebyshev(Mean, Sd) UCL	10.66
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	14.57
95% Approximate Gamma UCL	6.095	
95% Adjusted Gamma UCL	6.366	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 8.668

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 14

Raw Statistics

	Log-transformed Statistics	
Minimum	4.9 Minimum of Log Data	1.589
Maximum	21.3 Maximum of Log Data	3.059
Mean	8.322 Mean of log Data	2.04
Median	7.03 SD of log Data	0.384
SD	3.992	
Coefficient of Variation	0.48	
Skewness	2.337	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.751 Shapiro Wilk Test Statistic	0.907
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.01 95% H-UCL	9.961
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	11.65
95% Adjusted-CLT UCL (Chen-1995)	10.5 97.5% Chebyshev (MVUE) UCL	13.13
95% Modified-t UCL (Johnson-1978)	10.1 99% Chebyshev (MVUE) UCL	16.03

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	5.387 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.545	
MLE of Mean	8.322	
MLE of Standard Deviation	3.585	
nu star	183.2	
Approximate Chi Square Value (.05)	152.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	9.914
Adjusted Chi Square Value	150 95% Jackknife UCL	10.01
	95% Standard Bootstrap UCL	9.828
Anderson-Darling Test Statistic	0.684 95% Bootstrap-t UCL	11.26
Anderson-Darling 5% Critical Value	0.741 95% Hall's Bootstrap UCL	16.83
Kolmogorov-Smirnov Test Statistic	0.177 95% Percentile Bootstrap UCL	9.944
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	10.53
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.54
	97.5% Chebyshev(Mean, Sd) UCL	14.37
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	17.96
95% Approximate Gamma UCL	9.972	
95% Adjusted Gamma UCL	10.16	

Potential UCL to Use Use 95% Approximate Gamma UCL 9.972

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	0.3 Minimum of Log Data	-1.2
Maximum	0.88 Maximum of Log Data	-0.13
Mean	0.537 Mean of log Data	-0.64
Median	0.537 SD of log Data	0.207
SD	0.113	
Coefficient of Variation	0.21	
Skewness	1.285	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.715 Shapiro Wilk Test Statistic	0.74
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.585 95% H-UCL	0.591
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.656
95% Adjusted-CLT UCL (Chen-1995)	0.591 97.5% Chebyshev (MVUE) UCL	0.707
95% Modified-t UCL (Johnson-1978)	0.586 99% Chebyshev (MVUE) UCL	0.808

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	20.78 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0258	
MLE of Mean	0.537	
MLE of Standard Deviation	0.118	
nu star	706.6	
Approximate Chi Square Value (.05)	646 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	0.582
Adjusted Chi Square Value	639.9 95% Jackknife UCL	0.585
	95% Standard Bootstrap UCL	0.581
Anderson-Darling Test Statistic	2.291 95% Bootstrap-t UCL	0.594
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	0.754
Kolmogorov-Smirnov Test Statistic	0.356 95% Percentile Bootstrap UCL	0.581
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	0.588
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.656
	97.5% Chebyshev(Mean, Sd) UCL	0.708
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.809
95% Approximate Gamma UCL	0.588	
95% Adjusted Gamma UCL	0.593	

Potential UCL to Use

Use 95% Student's-t UCL	0.585
or 95% Modified-t UCL	0.586

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	15
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Raw Statistics

		Log-transformed Statistics	
Minimum	13.9	Minimum of Log Data	2.632
Maximum	108.2	Maximum of Log Data	4.684
Mean	52.16	Mean of log Data	3.821
Median	44.01	SD of log Data	0.553
SD	26.94		
Coefficient of Variation	0.517		
Skewness	0.705		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.883	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	63.57	95% H-UCL	70.96
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	84.6
95% Adjusted-CLT UCL (Chen-1995)	64.1	97.5% Chebyshev (MVUE) UCL	98.44
95% Modified-t UCL (Johnson-1978)	63.75	99% Chebyshev (MVUE) UCL	125.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.254	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	16.03		
MLE of Mean	52.16		
MLE of Standard Deviation	28.92		
nu star	110.6		
Approximate Chi Square Value (.05)	87.34	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	62.91
Adjusted Chi Square Value	85.18	95% Jackknife UCL	63.57
		95% Standard Bootstrap UCL	62.32
Anderson-Darling Test Statistic	0.671	95% Bootstrap-t UCL	65.55
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	63.84
Kolmogorov-Smirnov Test Statistic	0.214	95% Percentile Bootstrap UCL	63.06
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	63.98
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.64
		97.5% Chebyshev(Mean, Sd) UCL	92.96
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117.2
95% Approximate Gamma UCL	66.06		
95% Adjusted Gamma UCL	67.74		

Potential UCL to Use		Use 95% Approximate Gamma UCL	66.06
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	6.3 Minimum of Log Data	1.841
Maximum	190 Maximum of Log Data	5.247
Mean	39.79 Mean of log Data	3.379
Median	39.79 SD of log Data	0.793
SD	40.8	
Coefficient of Variation	1.026	
Skewness	3.412	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.524 Shapiro Wilk Test Statistic	0.825
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	57.06 95% H-UCL	64.06
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	74.64
95% Adjusted-CLT UCL (Chen-1995)	64.81 97.5% Chebyshev (MVUE) UCL	89.95
95% Modified-t UCL (Johnson-1978)	58.43 99% Chebyshev (MVUE) UCL	120

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.515 Data do not follow a Discernable Distribution (0.05)	
Theta Star	26.26	
MLE of Mean	39.79	
MLE of Standard Deviation	32.33	
nu star	51.5	
Approximate Chi Square Value (.05)	36.02 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	56.06
Adjusted Chi Square Value	34.67 95% Jackknife UCL	57.06
	95% Standard Bootstrap UCL	55.95
Anderson-Darling Test Statistic	1.673 95% Bootstrap-t UCL	77.83
Anderson-Darling 5% Critical Value	0.752 95% Hall's Bootstrap UCL	125.2
Kolmogorov-Smirnov Test Statistic	0.342 95% Percentile Bootstrap UCL	57.16
Kolmogorov-Smirnov 5% Critical Value	0.212 95% BCA Bootstrap UCL	67.86
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	82.92
	97.5% Chebyshev(Mean, Sd) UCL	101.6
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	138.3
95% Approximate Gamma UCL	56.89	
95% Adjusted Gamma UCL	59.11	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 82.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics	
Minimum	12458 Minimum of Log Data	9.43
Maximum	60384 Maximum of Log Data	11.01
Mean	24690 Mean of log Data	10.01
Median	18203 SD of log Data	0.455
SD	12790	
Coefficient of Variation	0.518	
Skewness	1.528	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.83 Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	30106 95% H-UCL	30912
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	36585
95% Adjusted-CLT UCL (Chen-1995)	31021 97.5% Chebyshev (MVUE) UCL	41820
95% Modified-t UCL (Johnson-1978)	30297 99% Chebyshev (MVUE) UCL	52102

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.093 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	6032	
MLE of Mean	24690	
MLE of Standard Deviation	12203	
nu star	139.2	
Approximate Chi Square Value (.05)	112.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	29792
Adjusted Chi Square Value	110.4 95% Jackknife UCL	30106
	95% Standard Bootstrap UCL	29689
Anderson-Darling Test Statistic	0.71 95% Bootstrap-t UCL	31695
Anderson-Darling 5% Critical Value	0.742 95% Hall's Bootstrap UCL	32709
Kolmogorov-Smirnov Test Statistic	0.217 95% Percentile Bootstrap UCL	29950
Kolmogorov-Smirnov 5% Critical Value	0.21 95% BCA Bootstrap UCL	31034
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	38211
	97.5% Chebyshev(Mean, Sd) UCL	44062
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	55554
95% Approximate Gamma UCL	30432	
95% Adjusted Gamma UCL	31115	

Potential UCL to Use Use 95% Approximate Gamma UCL 30432

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	255.4	Minimum of Log Data	5.543
Maximum	2054	Maximum of Log Data	7.628
Mean	708.6	Mean of log Data	6.359
Median	544.1	SD of log Data	0.634
SD	516.7		
Coefficient of Variation	0.729		
Skewness	1.599		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.806	Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	927.4	95% H-UCL	997.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1187
95% Adjusted-CLT UCL (Chen-1995)	966.6	97.5% Chebyshev (MVUE) UCL	1399
95% Modified-t UCL (Johnson-1978)	935.5	99% Chebyshev (MVUE) UCL	1816

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.183	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	324.6		
MLE of Mean	708.6		
MLE of Standard Deviation	479.6		
nu star	74.23		
Approximate Chi Square Value (.05)	55.39	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	914.7
Adjusted Chi Square Value	53.68	95% Jackknife UCL	927.4
		95% Standard Bootstrap UCL	918.5
Anderson-Darling Test Statistic	0.562	95% Bootstrap-t UCL	1066
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	1063
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	908.1
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL	990.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1255
		97.5% Chebyshev(Mean, Sd) UCL	1491
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1955
95% Approximate Gamma UCL	949.6		
95% Adjusted Gamma UCL	979.8		

Potential UCL to Use Use 95% Approximate Gamma UCL 949.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	10
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.0067	Minimum of Log Data	-5.01
Maximum	10	Maximum of Log Data	2.303
Mean	5.963	Mean of log Data	0.271
Median	9.2	SD of log Data	2.745
SD	4.771		
Coefficient of Variation	0.8		
Skewness	-0.44		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.693	Shapiro Wilk Test Statistic	0.722
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	7.983	95% H-UCL	3036
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	120.3
95% Adjusted-CLT UCL (Chen-1995)	7.734	97.5% Chebyshev (MVUE) UCL	160.3
95% Modified-t UCL (Johnson-1978)	7.963	99% Chebyshev (MVUE) UCL	238.8

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.393	Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.17		
MLE of Mean	5.963		
MLE of Standard Deviation	9.512		
nu star	13.36		
Approximate Chi Square Value (.05)	6.138	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	7.866
Adjusted Chi Square Value	5.631	95% Jackknife UCL	7.983
		95% Standard Bootstrap UCL	7.785
Anderson-Darling Test Statistic	2.54	95% Bootstrap-t UCL	7.864
Anderson-Darling 5% Critical Value	0.813	95% Hall's Bootstrap UCL	7.541
Kolmogorov-Smirnov Test Statistic	0.363	95% Percentile Bootstrap UCL	7.777
Kolmogorov-Smirnov 5% Critical Value	0.223	95% BCA Bootstrap UCL	7.793
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.01
		97.5% Chebyshev(Mean, Sd) UCL	13.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.48
95% Approximate Gamma UCL	12.98		
95% Adjusted Gamma UCL	14.15		

Potential UCL to Use

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	17.48
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	12.6 Minimum of Log Data	2.534
Maximum	131.5 Maximum of Log Data	4.879
Mean	66.1 Mean of log Data	4.047
Median	65 SD of log Data	0.634
SD	29.96	
Coefficient of Variation	0.453	
Skewness	0.135	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.895 Shapiro Wilk Test Statistic	0.773
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	78.79 95% H-UCL	98.88
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	117.6
95% Adjusted-CLT UCL (Chen-1995)	78.31 97.5% Chebyshev (MVUE) UCL	138.7
95% Modified-t UCL (Johnson-1978)	78.83 99% Chebyshev (MVUE) UCL	180

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.033 Data appear Normal at 5% Significance Level	
Theta Star	21.79	
MLE of Mean	66.1	
MLE of Standard Deviation	37.95	
nu star	103.1	
Approximate Chi Square Value (.05)	80.69 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	78.05
Adjusted Chi Square Value	78.62 95% Jackknife UCL	78.79
	95% Standard Bootstrap UCL	77.43
Anderson-Darling Test Statistic	1.448 95% Bootstrap-t UCL	79.36
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	80.41
Kolmogorov-Smirnov Test Statistic	0.322 95% Percentile Bootstrap UCL	78.08
Kolmogorov-Smirnov 5% Critical Value	0.21 95% BCA Bootstrap UCL	77.74
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	97.77
	97.5% Chebyshev(Mean, Sd) UCL	111.5
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	138.4
95% Approximate Gamma UCL	84.47	
95% Adjusted Gamma UCL	86.71	

Potential UCL to Use Use 95% Student's-t UCL 78.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	0.012 Minimum of Log Data	-4.42
Maximum	16.09 Maximum of Log Data	2.778
Mean	7.576 Mean of log Data	0.742
Median	10 SD of log Data	2.607
SD	5.592	
Coefficient of Variation	0.738	
Skewness	-0.336	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.832 Shapiro Wilk Test Statistic	0.704
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	9.944 95% H-UCL	2317
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	143
95% Adjusted-CLT UCL (Chen-1995)	9.689 97.5% Chebyshev (MVUE) UCL	190.2
95% Modified-t UCL (Johnson-1978)	9.925 99% Chebyshev (MVUE) UCL	282.7

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.447 Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.93	
MLE of Mean	7.576	
MLE of Standard Deviation	11.33	
nu star	15.21	
Approximate Chi Square Value (.05)	7.409 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	9.807
Adjusted Chi Square Value	6.844 95% Jackknife UCL	9.944
	95% Standard Bootstrap UCL	9.753
Anderson-Darling Test Statistic	2.437 95% Bootstrap-t UCL	9.706
Anderson-Darling 5% Critical Value	0.799 95% Hall's Bootstrap UCL	9.586
Kolmogorov-Smirnov Test Statistic	0.391 95% Percentile Bootstrap UCL	9.77
Kolmogorov-Smirnov 5% Critical Value	0.221 95% BCA Bootstrap UCL	9.494
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	13.49
	97.5% Chebyshev(Mean, Sd) UCL	16.05
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	21.07
95% Approximate Gamma UCL	15.55	
95% Adjusted Gamma UCL	16.84	

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 21.07

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.008 Minimum of Log Data	-4.83
Maximum	0.737 Maximum of Log Data	-0.31
Mean	0.233 Mean of log Data	-1.94
Median	0.233 SD of log Data	1.378
SD	0.164	
Coefficient of Variation	0.707	
Skewness	1.58	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.691 Shapiro Wilk Test Statistic	0.617
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.302 95% H-UCL	1.145
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.903
95% Adjusted-CLT UCL (Chen-1995)	0.314 97.5% Chebyshev (MVUE) UCL	1.148
95% Modified-t UCL (Johnson-1978)	0.305 99% Chebyshev (MVUE) UCL	1.629

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.006 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.231	
MLE of Mean	0.233	
MLE of Standard Deviation	0.232	
nu star	34.21	
Approximate Chi Square Value (.05)	21.83 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	0.298
Adjusted Chi Square Value	20.8 95% Jackknife UCL	0.302
	95% Standard Bootstrap UCL	0.296
Anderson-Darling Test Statistic	3.051 95% Bootstrap-t UCL	0.321
Anderson-Darling 5% Critical Value	0.762 95% Hall's Bootstrap UCL	0.7
Kolmogorov-Smirnov Test Statistic	0.446 95% Percentile Bootstrap UCL	0.298
Kolmogorov-Smirnov 5% Critical Value	0.214 95% BCA Bootstrap UCL	0.311
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.406
	97.5% Chebyshev(Mean, Sd) UCL	0.482
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.629
95% Approximate Gamma UCL	0.364	
95% Adjusted Gamma UCL	0.382	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.406

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	16.5 Minimum of Log Data	2.803
Maximum	37.9 Maximum of Log Data	3.635
Mean	26.41 Mean of log Data	3.253
Median	26.41 SD of log Data	0.213
SD	5.404	
Coefficient of Variation	0.205	
Skewness	0.193	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.823 Shapiro Wilk Test Statistic	0.812
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	28.7 95% H-UCL	29.13
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	32.42
95% Adjusted-CLT UCL (Chen-1995)	28.64 97.5% Chebyshev (MVUE) UCL	35.01
95% Modified-t UCL (Johnson-1978)	28.71 99% Chebyshev (MVUE) UCL	40.11

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	20.15 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.311	
MLE of Mean	26.41	
MLE of Standard Deviation	5.884	
nu star	685.2	
Approximate Chi Square Value (.05)	625.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0346 95% CLT UCL	28.57
Adjusted Chi Square Value	619.5 95% Jackknife UCL	28.7
	95% Standard Bootstrap UCL	28.5
Anderson-Darling Test Statistic	1.776 95% Bootstrap-t UCL	28.73
Anderson-Darling 5% Critical Value	0.738 95% Hall's Bootstrap UCL	29.17
Kolmogorov-Smirnov Test Statistic	0.35 95% Percentile Bootstrap UCL	28.58
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	28.57
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	32.13
	97.5% Chebyshev(Mean, Sd) UCL	34.6
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	39.46
95% Approximate Gamma UCL	28.94	
95% Adjusted Gamma UCL	29.22	

Potential UCL to Use

Use 95% Student's-t UCL	28.7
or 95% Modified-t UCL	28.71

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	217-01.wst		
Full Precision	OFF		
Confidence Coefficient			95%
Number of Bootstrap Operations			2000
Chromium			
General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	15.8	Minimum of Log Data	2.76
Maximum	88.9	Maximum of Log Data	4.488
Mean	75.16	Mean of log Data	4.246
Median	85	SD of log Data	0.479
SD	21.42		
Coefficient of Variation	0.285		
Skewness	-2.184		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.594	Shapiro Wilk Test Statistic	0.514
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	85.75	95% H-UCL	104.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	123.6
95% Adjusted-CLT UCL (Chen-1995)	81.09	97.5% Chebyshev (MVUE) UCL	143.5
95% Modified-t UCL (Johnson-1978)	85.15	99% Chebyshev (MVUE) UCL	182.5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.401	Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.92		
MLE of Mean	75.16		
MLE of Standard Deviation	32.34		
nu star	140.4		
Approximate Chi Square Value (.05)	114	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	84.93
Adjusted Chi Square Value	110.7	95% Jackknife UCL	85.75
		95% Standard Bootstrap UCL	84.37
Anderson-Darling Test Statistic	2.726	95% Bootstrap-t UCL	82.77
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	81.98
Kolmogorov-Smirnov Test Statistic	0.445	95% Percentile Bootstrap UCL	83.16
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	82.56
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	101.1
		97.5% Chebyshev(Mean, Sd) UCL	112.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	134.3
95% Approximate Gamma UCL	92.55		
95% Adjusted Gamma UCL	95.38		
Potential UCL to Use		Use 95% Student's-t UCL	85.75
		or 95% Modified-t UCL	85.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Cobalt

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
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Raw Statistics

Minimum	11.4	Log-transformed Statistics	
Maximum	25	Minimum of Log Data	2.434
Mean	18.2	Maximum of Log Data	3.219
Median	18.2	Mean of log Data	2.89
SD	2.776	SD of log Data	0.163
Coefficient of Variation	0.153		
Skewness	5.76E-15		

Warning: There are only 3 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.557
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19.57	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	19.84
95% Adjusted-CLT UCL (Chen-1995)	19.47	95% Chebyshev (MVUE) UCL	21.81
95% Modified-t UCL (Johnson-1978)	19.57	97.5% Chebyshev (MVUE) UCL	23.36
		99% Chebyshev (MVUE) UCL	26.42

Gamma Distribution Test

k star (bias corrected)	33.43	Data Distribution	
Theta Star	0.544	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	18.2		
MLE of Standard Deviation	3.148		
nu star	869.3		
Approximate Chi Square Value (.05)	801.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	19.47
Adjusted Chi Square Value	792.6	95% Jackknife UCL	19.57
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.096	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.443	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21.56
		97.5% Chebyshev(Mean, Sd) UCL	23.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	25.86
95% Approximate Gamma UCL	19.73		
95% Adjusted Gamma UCL	19.96		

Potential UCL to Use	Use 95% Student's-t UCL	19.57
	or 95% Modified-t UCL	19.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
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Raw Statistics

		Log-transformed Statistics	
Minimum	90.73	Minimum of Log Data	4.508
Maximum	1956	Maximum of Log Data	7.579
Mean	476.4	Mean of log Data	5.785
Median	278.1	SD of log Data	0.86
SD	514.9		
Coefficient of Variation	1.081		
Skewness	2.333		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.706	Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	730.9	95% H-UCL	900.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	955.9
95% Adjusted-CLT UCL (Chen-1995)	810	97.5% Chebyshev (MVUE) UCL	1173
95% Modified-t UCL (Johnson-1978)	746.3	99% Chebyshev (MVUE) UCL	1600

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.171	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	406.8		
MLE of Mean	476.4		
MLE of Standard Deviation	440.2		
nu star	30.45		
Approximate Chi Square Value (.05)	18.85	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	711.3
Adjusted Chi Square Value	17.55	95% Jackknife UCL	730.9
		95% Standard Bootstrap UCL	693.8
Anderson-Darling Test Statistic	0.535	95% Bootstrap-t UCL	1133
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1768
Kolmogorov-Smirnov Test Statistic	0.17	95% Percentile Bootstrap UCL	721.3
Kolmogorov-Smirnov 5% Critical Value	0.241	95% BCA Bootstrap UCL	826.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1099
		97.5% Chebyshev(Mean, Sd) UCL	1368
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1897
95% Approximate Gamma UCL	769.7		
95% Adjusted Gamma UCL	826.3		

Potential UCL to Use		Use 95% Approximate Gamma UCL	769.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	11.4 Minimum of Log Data	2.434
Maximum	130.4 Maximum of Log Data	4.871
Mean	69.19 Mean of log Data	4.09
Median	65 SD of log Data	0.645
SD	32.85	
Coefficient of Variation	0.475	
Skewness	0.333	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.881 Shapiro Wilk Test Statistic	0.792
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	85.42	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	112.7
95% Adjusted-CLT UCL (Chen-1995)	85.07	95% Chebyshev (MVUE) UCL	130.7
95% Modified-t UCL (Johnson-1978)	85.56	97.5% Chebyshev (MVUE) UCL	156.1
		99% Chebyshev (MVUE) UCL	205.9

Gamma Distribution Test

k star (bias corrected)	2.786	Data Distribution	
Theta Star	24.84	Data appear Normal at 5% Significance Level	
MLE of Mean	69.19		
MLE of Standard Deviation	41.45		
nu star	72.43		
Approximate Chi Square Value (.05)	53.83	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	84.17
Adjusted Chi Square Value	51.56	95% Jackknife UCL	85.42
		95% Standard Bootstrap UCL	83.85
Anderson-Darling Test Statistic	1.034	95% Bootstrap-t UCL	88.37
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	92.75
Kolmogorov-Smirnov Test Statistic	0.297	95% Percentile Bootstrap UCL	83.61
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	84.16
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	108.9
		97.5% Chebyshev(Mean, Sd) UCL	126.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	159.8
95% Approximate Gamma UCL	93.09		
95% Adjusted Gamma UCL	97.2		

Potential UCL to Use

Use 95% Student's-t UCL 85.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.016	Minimum of Log Data	-4.135
Maximum	13.45	Maximum of Log Data	2.599
Mean	8.835	Mean of log Data	1.382
Median		10 SD of log Data	2.345
SD	4.034		
Coefficient of Variation	0.457		
Skewness	-1.862		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.616	Shapiro Wilk Test Statistic	0.481
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.83	95% H-UCL	2661
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	147
95% Adjusted-CLT UCL (Chen-1995)	10.06	97.5% Chebyshev (MVUE) UCL	194.9
95% Modified-t UCL (Johnson-1978)	10.73	99% Chebyshev (MVUE) UCL	289.1

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.629	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.04		
MLE of Mean	8.835		
MLE of Standard Deviation	11.14		
nu star	16.36		
Approximate Chi Square Value (.05)	8.217	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.68
Adjusted Chi Square Value	7.408	95% Jackknife UCL	10.83
		95% Standard Bootstrap UCL	10.64
Anderson-Darling Test Statistic	3.786	95% Bootstrap-t UCL	10.32
Anderson-Darling 5% Critical Value	0.77	95% Hall's Bootstrap UCL	10.16
Kolmogorov-Smirnov Test Statistic	0.536	95% Percentile Bootstrap UCL	10.47
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	10.31
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.71
		97.5% Chebyshev(Mean, Sd) UCL	15.82
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.97
95% Approximate Gamma UCL	17.59		
95% Adjusted Gamma UCL	19.51		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 19.97

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
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Raw Statistics	Log-transformed Statistics		
Minimum	0.98	Minimum of Log Data	-0.0202
Maximum	1.27	Maximum of Log Data	0.239
Mean	1.125	Mean of log Data	0.116
Median	1.125	SD of log Data	0.053
SD	0.0592		
Coefficient of Variation	0.0526		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.572
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	1.154	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.197
95% Adjusted-CLT UCL (Chen-1995)	1.152	97.5% Chebyshev (MVUE) UCL	1.228
95% Modified-t UCL (Johnson-1978)	1.154	99% Chebyshev (MVUE) UCL	1.29

Gamma Distribution Test	Data Distribution		
k star (bias corrected)	298.7	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00377		
MLE of Mean	1.125		
MLE of Standard Deviation	0.0651		
nu star	7765		
Approximate Chi Square Value (.05)	7561	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	1.152
Adjusted Chi Square Value	7532	95% Jackknife UCL	1.154
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.076	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.43	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.197
		97.5% Chebyshev(Mean, Sd) UCL	1.228
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.288
95% Approximate Gamma UCL	1.155		
95% Adjusted Gamma UCL	1.16		

Potential UCL to Use	Use 95% Student's-t UCL	1.154
	or 95% Modified-t UCL	1.154

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	217-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.44	Log-transformed Statistics	
Maximum	20	Minimum of Log Data	-0.821
Mean	4.794	Maximum of Log Data	2.996
Median	4.794	Mean of log Data	1.255
SD	4.256	SD of log Data	0.891
Coefficient of Variation	0.888		
Skewness	3.019		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.547	Shapiro Wilk Test Statistic	0.745
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.596	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.102
95% Adjusted-CLT UCL (Chen-1995)	7.3	95% Chebyshev (MVUE) UCL	10.23
95% Modified-t UCL (Johnson-1978)	6.722	97.5% Chebyshev (MVUE) UCL	12.47
		99% Chebyshev (MVUE) UCL	16.88

Gamma Distribution Test

k star (bias corrected)	1.478	Data Distribution	
Theta Star	3.245	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.794		
MLE of Standard Deviation	3.944		
nu star	50.24		
Approximate Chi Square Value (.05)	34.96	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	6.492
Adjusted Chi Square Value	33.63	95% Jackknife UCL	6.596
		95% Standard Bootstrap UCL	6.423
Anderson-Darling Test Statistic	2.374	95% Bootstrap-t UCL	7.821
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	14.02
Kolmogorov-Smirnov Test Statistic	0.365	95% Percentile Bootstrap UCL	6.596
Kolmogorov-Smirnov 5% Critical Value	0.212	95% BCA Bootstrap UCL	7.411
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.294
		97.5% Chebyshev(Mean, Sd) UCL	11.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.07
95% Approximate Gamma UCL	6.888		
95% Adjusted Gamma UCL	7.162		

Potential UCL to Use

		Use 95% Chebyshev (Mean, Sd) UCL	9.294
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	3.8 Minimum of Log Data	1.335
Maximum	21.3 Maximum of Log Data	3.059
Mean	9.32 Mean of log Data	2.154
Median	9.32 SD of log Data	0.408
SD	3.998	
Coefficient of Variation	0.429	
Skewness	1.545	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.841 Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	11.01 95% H-UCL	11.42
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	13.42
95% Adjusted-CLT UCL (Chen-1995)	11.3 97.5% Chebyshev (MVUE) UCL	15.2
95% Modified-t UCL (Johnson-1978)	11.07 99% Chebyshev (MVUE) UCL	18.69

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	5.41 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.723	
MLE of Mean	9.32	
MLE of Standard Deviation	4.007	
nu star	183.9	
Approximate Chi Square Value (.05)	153.6 Nonparametric Statistics	
Adjusted Level of Significance	0.035 95% CLT UCL	10.91
Adjusted Chi Square Value	150.7 95% Jackknife UCL	11.01
	95% Standard Bootstrap UCL	10.82
Anderson-Darling Test Statistic	0.591 95% Bootstrap-t UCL	11.62
Anderson-Darling 5% Critical Value	0.741 95% Hall's Bootstrap UCL	12.84
Kolmogorov-Smirnov Test Statistic	0.184 95% Percentile Bootstrap UCL	10.94
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	11.15
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	13.55
	97.5% Chebyshev(Mean, Sd) UCL	15.38
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.97
95% Approximate Gamma UCL	11.16	
95% Adjusted Gamma UCL	11.38	

Potential UCL to Use Use 95% Approximate Gamma UCL 11.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	7.9 Minimum of Log Data	2.067
Maximum	108.2 Maximum of Log Data	4.684
Mean	70.4 Mean of log Data	4.081
Median	85 SD of log Data	0.743
SD	29.52	
Coefficient of Variation	0.419	
Skewness	-1.26	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.716 Shapiro Wilk Test Statistic	0.643
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	82.9 95% H-UCL	119.5
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	140.4
95% Adjusted-CLT UCL (Chen-1995)	79.83 97.5% Chebyshev (MVUE) UCL	168.1
95% Modified-t UCL (Johnson-1978)	82.53 99% Chebyshev (MVUE) UCL	222.4

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.538 Data do not follow a Discernable Distribution (0.05)	
Theta Star	27.73	
MLE of Mean	70.4	
MLE of Standard Deviation	44.19	
nu star	86.31	
Approximate Chi Square Value (.05)	65.89 Nonparametric Statistics	
Adjusted Level of Significance	0.035 95% CLT UCL	82.18
Adjusted Chi Square Value	64.02 95% Jackknife UCL	82.9
	95% Standard Bootstrap UCL	81.85
Anderson-Darling Test Statistic	2.87 95% Bootstrap-t UCL	81.44
Anderson-Darling 5% Critical Value	0.745 95% Hall's Bootstrap UCL	79.38
Kolmogorov-Smirnov Test Statistic	0.401 95% Percentile Bootstrap UCL	81.05
Kolmogorov-Smirnov 5% Critical Value	0.211 95% BCA Bootstrap UCL	79.85
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	101.6
	97.5% Chebyshev(Mean, Sd) UCL	115.1
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	141.6
95% Approximate Gamma UCL	92.21	
95% Adjusted Gamma UCL	94.91	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 101.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	6.7 Minimum of Log Data	1.902
Maximum	27 Maximum of Log Data	3.296
Mean	15.6 Mean of log Data	2.706
Median	15.6 SD of log Data	0.314
SD	4.262	
Coefficient of Variation	0.273	
Skewness	0.266	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.712 Shapiro Wilk Test Statistic	0.671
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	17.4 95% H-UCL	18.22
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	20.96
95% Adjusted-CLT UCL (Chen-1995)	17.37 97.5% Chebyshev (MVUE) UCL	23.24
95% Modified-t UCL (Johnson-1978)	17.42 99% Chebyshev (MVUE) UCL	27.73

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	10.19 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.531	
MLE of Mean	15.6	
MLE of Standard Deviation	4.887	
nu star	346.4	
Approximate Chi Square Value (.05)	304.3 Nonparametric Statistics	
Adjusted Level of Significance	0.035 95% CLT UCL	17.3
Adjusted Chi Square Value	300.1 95% Jackknife UCL	17.4
	95% Standard Bootstrap UCL	17.25
Anderson-Darling Test Statistic	2.826 95% Bootstrap-t UCL	17.36
Anderson-Darling 5% Critical Value	0.739 95% Hall's Bootstrap UCL	17.85
Kolmogorov-Smirnov Test Statistic	0.42 95% Percentile Bootstrap UCL	17.31
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	17.38
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	20.11
	97.5% Chebyshev(Mean, Sd) UCL	22.06
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	25.89
95% Approximate Gamma UCL	17.76	
95% Adjusted Gamma UCL	18	

Potential UCL to Use

Use 95% Student's-t UCL 17.4
or 95% Modified-t UCL 17.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	11304	Minimum of Log Data	9.333
Maximum	60384	Maximum of Log Data	11.01
Mean	25124	Mean of log Data	10.03
Median	20598	SD of log Data	0.458
SD	12694		
Coefficient of Variation	0.505		
Skewness	1.445		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.864	Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	30499	95% H-UCL	31597
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	37411
95% Adjusted-CLT UCL (Chen-1995)	31341	97.5% Chebyshev (MVUE) UCL	42789
95% Modified-t UCL (Johnson-1978)	30678	99% Chebyshev (MVUE) UCL	53353

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.142	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	6066		
MLE of Mean	25124		
MLE of Standard Deviation	12345		
nu star	140.8		
Approximate Chi Square Value (.05)	114.4	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	30188
Adjusted Chi Square Value	111.9	95% Jackknife UCL	30499
		95% Standard Bootstrap UCL	30004
Anderson-Darling Test Statistic	0.427	95% Bootstrap-t UCL	32380
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	33410
Kolmogorov-Smirnov Test Statistic	0.172	95% Percentile Bootstrap UCL	30338
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	31096
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38543
		97.5% Chebyshev(Mean, Sd) UCL	44350
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	55756
95% Approximate Gamma UCL	30926		
95% Adjusted Gamma UCL	31616		

Potential UCL to Use Use 95% Approximate Gamma UCL 30926

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	205.7	Minimum of Log Data	5.326
Maximum	2054	Maximum of Log Data	7.628
Mean	637	Mean of log Data	6.269
Median	544.1	SD of log Data	0.609
SD	458		
Coefficient of Variation	0.719		
Skewness	2.075		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.791	Shapiro Wilk Test Statistic	0.972
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	830.9	95% H-UCL	881.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1050
95% Adjusted-CLT UCL (Chen-1995)	879.4	97.5% Chebyshev (MVUE) UCL	1233
95% Modified-t UCL (Johnson-1978)	840.3	99% Chebyshev (MVUE) UCL	1592

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.359	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	270		
MLE of Mean	637		
MLE of Standard Deviation	414.7		
nu star	80.22		
Approximate Chi Square Value (.05)	60.58	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	819.7
Adjusted Chi Square Value	58.8	95% Jackknife UCL	830.9
		95% Standard Bootstrap UCL	813.9
Anderson-Darling Test Statistic	0.374	95% Bootstrap-t UCL	958.8
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	1707
Kolmogorov-Smirnov Test Statistic	0.137	95% Percentile Bootstrap UCL	821.5
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL	884.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1121
		97.5% Chebyshev(Mean, Sd) UCL	1331
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1742
95% Approximate Gamma UCL	843.5		
95% Adjusted Gamma UCL	869.1		

Potential UCL to Use Use 95% Approximate Gamma UCL 843.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.007	Minimum of Log Data	-5.006
Maximum		10 Maximum of Log Data	2.303
Mean	6.811	Mean of log Data	0.698
Median		10 SD of log Data	2.571
SD	4.553		
Coefficient of Variation	0.668		
Skewness	-0.9		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.649	Shapiro Wilk Test Statistic	0.661
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	8.739	95% H-UCL	1830
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	126.6
95% Adjusted-CLT UCL (Chen-1995)	8.37	97.5% Chebyshev (MVUE) UCL	168.1
95% Modified-t UCL (Johnson-1978)	8.699	99% Chebyshev (MVUE) UCL	249.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.465	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.63		
MLE of Mean	6.811		
MLE of Standard Deviation	9.983		
nu star	15.82		
Approximate Chi Square Value (.05)	7.839	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	8.627
Adjusted Chi Square Value	7.255	95% Jackknife UCL	8.739
		95% Standard Bootstrap UCL	8.588
Anderson-Darling Test Statistic	3.294	95% Bootstrap-t UCL	8.452
Anderson-Darling 5% Critical Value	0.796	95% Hall's Bootstrap UCL	8.354
Kolmogorov-Smirnov Test Statistic	0.386	95% Percentile Bootstrap UCL	8.557
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	8.275
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.62
		97.5% Chebyshev(Mean, Sd) UCL	13.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.8
95% Approximate Gamma UCL	13.75		
95% Adjusted Gamma UCL	14.86		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.8
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 10

Raw Statistics

	Log-transformed Statistics	
Minimum	13.8 Minimum of Log Data	2.625
Maximum	131.5 Maximum of Log Data	4.879
Mean	69.24 Mean of log Data	4.144
Median	65 SD of log Data	0.504
SD	26.63	
Coefficient of Variation	0.385	
Skewness	0.337	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.829 Shapiro Wilk Test Statistic	0.728
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	80.51 95% H-UCL	92.57
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	110.1
95% Adjusted-CLT UCL (Chen-1995)	80.42 97.5% Chebyshev (MVUE) UCL	127
95% Modified-t UCL (Johnson-1978)	80.6 99% Chebyshev (MVUE) UCL	160.3

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.552 Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.21	
MLE of Mean	69.24	
MLE of Standard Deviation	32.45	
nu star	154.8	

Approximate Chi Square Value (.05)

	127 Nonparametric Statistics	
Adjusted Level of Significance	0.035 95% CLT UCL	79.86
Adjusted Chi Square Value	124.4 95% Jackknife UCL	80.51
	95% Standard Bootstrap UCL	79.28
Anderson-Darling Test Statistic	1.89 95% Bootstrap-t UCL	81.75
Anderson-Darling 5% Critical Value	0.741 95% Hall's Bootstrap UCL	86.04
Kolmogorov-Smirnov Test Statistic	0.373 95% Percentile Bootstrap UCL	79.59
Kolmogorov-Smirnov 5% Critical Value	0.21 95% BCA Bootstrap UCL	79.4
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	97.39
	97.5% Chebyshev(Mean, Sd) UCL	109.6
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	133.5
95% Approximate Gamma UCL	84.37	
95% Adjusted Gamma UCL	86.16	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 97.39

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	0.034	Minimum of Log Data	-3.381
Maximum	16.09	Maximum of Log Data	2.778
Mean	8.683	Mean of log Data	1.567
Median	10	SD of log Data	1.738
SD	4.796		
Coefficient of Variation	0.552		
Skewness	-0.74		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.832	Shapiro Wilk Test Statistic	0.622
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.71	95% H-UCL	118.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	57.29
95% Adjusted-CLT UCL (Chen-1995)	10.37	97.5% Chebyshev (MVUE) UCL	74.27
95% Modified-t UCL (Johnson-1978)	10.68	99% Chebyshev (MVUE) UCL	107.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.841	Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.32		
MLE of Mean	8.683		
MLE of Standard Deviation	9.465		
nu star	28.61		
Approximate Chi Square Value (.05)	17.4	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	10.6
Adjusted Chi Square Value	16.49	95% Jackknife UCL	10.71
		95% Standard Bootstrap UCL	10.53
Anderson-Darling Test Statistic	2.785	95% Bootstrap-t UCL	10.46
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	10.41
Kolmogorov-Smirnov Test Statistic	0.399	95% Percentile Bootstrap UCL	10.54
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	10.34
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.75
		97.5% Chebyshev(Mean, Sd) UCL	15.95
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.26
95% Approximate Gamma UCL	14.27		
95% Adjusted Gamma UCL	15.06		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 20.26

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.01	Minimum of Log Data -4.636
Maximum	0.737	Maximum of Log Data -0.306
Mean	0.369	Mean of log Data -1.172
Median	0.369	SD of log Data 0.908
SD	0.129	
Coefficient of Variation	0.349	
Skewness	0.117	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.501	Shapiro Wilk Test Statistic 0.353
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value 0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.423	95% H-UCL 0.832
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.927
95% Adjusted-CLT UCL (Chen-1995)	0.421	97.5% Chebyshev (MVUE) UCL 1.133
95% Modified-t UCL (Johnson-1978)	0.423	99% Chebyshev (MVUE) UCL 1.536

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.525	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.146	
MLE of Mean	0.369	
MLE of Standard Deviation	0.232	
nu star	85.84	
Approximate Chi Square Value (.05)	65.48	Nonparametric Statistics
Adjusted Level of Significance	0.035	95% CLT UCL 0.42
Adjusted Chi Square Value	63.62	95% Jackknife UCL 0.423
		95% Standard Bootstrap UCL 0.419
Anderson-Darling Test Statistic	4.934	95% Bootstrap-t UCL 0.416
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL 0.439
Kolmogorov-Smirnov Test Statistic	0.501	95% Percentile Bootstrap UCL 0.413
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL 0.432
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.505
		97.5% Chebyshev(Mean, Sd) UCL 0.564
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.679
95% Approximate Gamma UCL	0.483	
95% Adjusted Gamma UCL	0.498	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.505

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	221-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	4170	Minimum of Log Data	8.336
Maximum	52800	Maximum of Log Data	10.87
Mean	19493	Mean of log Data	9.773
Median	19493	SD of log Data	0.497
SD	9702		
Coefficient of Variation	0.498		
Skewness	2.475		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.666
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	23601	95% H-UCL	25558
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30385
95% Adjusted-CLT UCL (Chen-1995)	24872	97.5% Chebyshev (MVUE) UCL	35008
95% Modified-t UCL (Johnson-1978)	23836	99% Chebyshev (MVUE) UCL	44090

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.097	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4757		
MLE of Mean	19493		
MLE of Standard Deviation	9630		
nu star	139.3		
Approximate Chi Square Value (.05)	113	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	23363
Adjusted Chi Square Value	110.6	95% Jackknife UCL	23601
		95% Standard Bootstrap UCL	23305
Anderson-Darling Test Statistic	2.968	95% Bootstrap-t UCL	25316
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	42994
Kolmogorov-Smirnov Test Statistic	0.383	95% Percentile Bootstrap UCL	23556
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	24469
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29749
		97.5% Chebyshev(Mean, Sd) UCL	34187
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	42904
95% Approximate Gamma UCL	24023		
95% Adjusted Gamma UCL	24562		

Potential UCL to Use

Use 95% Student's-t UCL	23601
or 95% Modified-t UCL	23836

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

Minimum	0.25	Log-transformed Statistics	
Maximum	1.1	Minimum of Log Data	-1.386
Mean	0.505	Maximum of Log Data	0.0953
Median	0.505	Mean of log Data	-0.728
SD	0.173	SD of log Data	0.299
Coefficient of Variation	0.343		
Skewness	2.5		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.572	Shapiro Wilk Test Statistic	0.677
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.578	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.581
95% Adjusted-CLT UCL (Chen-1995)	0.601	95% Chebyshev (MVUE) UCL	0.665
95% Modified-t UCL (Johnson-1978)	0.583	97.5% Chebyshev (MVUE) UCL	0.735
		99% Chebyshev (MVUE) UCL	0.872

Gamma Distribution Test

k star (bias corrected)	9.428	Data Distribution	
Theta Star	0.0536	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.505		
MLE of Standard Deviation	0.164		
nu star	320.6		
Approximate Chi Square Value (.05)	280.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	0.574
Adjusted Chi Square Value	276.1	95% Jackknife UCL	0.578
		95% Standard Bootstrap UCL	0.572
Anderson-Darling Test Statistic	2.992	95% Bootstrap-t UCL	0.61
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	0.921
Kolmogorov-Smirnov Test Statistic	0.402	95% Percentile Bootstrap UCL	0.575
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	0.61
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.688
		97.5% Chebyshev(Mean, Sd) UCL	0.767
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.923
95% Approximate Gamma UCL	0.578		
95% Adjusted Gamma UCL	0.586		

Potential UCL to Use

Use 95% Student's-t UCL 0.578
or 95% Modified-t UCL 0.583

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	2.6	Minimum of Log Data	0.956
Maximum	28.4	Maximum of Log Data	3.346
Mean	10.06	Mean of log Data	2.198
Median	10.06	SD of log Data	0.484
SD	5.457		
Coefficient of Variation	0.543		
Skewness	2.456		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.734	Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.37	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.93
95% Adjusted-CLT UCL (Chen-1995)	13.08	95% Chebyshev (MVUE) UCL	15.36
95% Modified-t UCL (Johnson-1978)	12.5	97.5% Chebyshev (MVUE) UCL	17.65
		99% Chebyshev (MVUE) UCL	22.17

Gamma Distribution Test

k star (bias corrected)	3.893	Data Distribution	
Theta Star	2.584	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.06		
MLE of Standard Deviation	5.098		
nu star	132.4		
Approximate Chi Square Value (.05)	106.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	12.24
Adjusted Chi Square Value	104.4	95% Jackknife UCL	12.37
		95% Standard Bootstrap UCL	12.16
Anderson-Darling Test Statistic	0.869	95% Bootstrap-t UCL	13.86
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	23.13
Kolmogorov-Smirnov Test Statistic	0.245	95% Percentile Bootstrap UCL	12.28
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	12.89
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.83
		97.5% Chebyshev(Mean, Sd) UCL	18.32
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	23.23
95% Approximate Gamma UCL	12.47		
95% Adjusted Gamma UCL	12.75		

Potential UCL to Use

Use 95% Student's-t UCL 12.37
or 95% Modified-t UCL 12.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

Minimum	121	Log-transformed Statistics	
Maximum	1630	Minimum of Log Data	4.796
Mean	527	Maximum of Log Data	7.396
Median	527	Mean of log Data	6.116
SD	319	SD of log Data	0.594
Coefficient of Variation	0.605		
Skewness	2.59		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.561	Shapiro Wilk Test Statistic	0.678
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	662.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	742.1
95% Adjusted-CLT UCL (Chen-1995)	706.2	95% Chebyshev (MVUE) UCL	884.7
95% Modified-t UCL (Johnson-1978)	670.2	97.5% Chebyshev (MVUE) UCL	1036
		99% Chebyshev (MVUE) UCL	1334

Gamma Distribution Test

k star (bias corrected)	2.897	Data Distribution	
Theta Star	181.9	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	527		
MLE of Standard Deviation	309.6		
nu star	98.51		
Approximate Chi Square Value (.05)	76.61	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	654.3
Adjusted Chi Square Value	74.59	95% Jackknife UCL	662.1
		95% Standard Bootstrap UCL	653.2
Anderson-Darling Test Statistic	2.983	95% Bootstrap-t UCL	725.3
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	1275
Kolmogorov-Smirnov Test Statistic	0.395	95% Percentile Bootstrap UCL	656.8
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	714.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	864.2
		97.5% Chebyshev(Mean, Sd) UCL	1010
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1297
95% Approximate Gamma UCL	677.6		
95% Adjusted Gamma UCL	696		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 864.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.17	Minimum of Log Data	-1.772
Maximum	2.7	Maximum of Log Data	0.993
Mean	1.028	Mean of log Data	-0.0885
Median	1.028	SD of log Data	0.55
SD	0.497		
Coefficient of Variation	0.484		
Skewness	2.195		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.576	Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.238	95% H-UCL	1.418
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.69
95% Adjusted-CLT UCL (Chen-1995)	1.294	97.5% Chebyshev (MVUE) UCL	1.966
95% Modified-t UCL (Johnson-1978)	1.249	99% Chebyshev (MVUE) UCL	2.507

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.733	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.275		
MLE of Mean	1.028		
MLE of Standard Deviation	0.532		
nu star	126.9		
Approximate Chi Square Value (.05)	101.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	1.226
Adjusted Chi Square Value	99.55	95% Jackknife UCL	1.238
		95% Standard Bootstrap UCL	1.22
Anderson-Darling Test Statistic	3.244	95% Bootstrap-t UCL	1.292
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	2.305
Kolmogorov-Smirnov Test Statistic	0.386	95% Percentile Bootstrap UCL	1.236
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	1.323
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.553
		97.5% Chebyshev(Mean, Sd) UCL	1.78
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.227
95% Approximate Gamma UCL	1.28		
95% Adjusted Gamma UCL	1.31		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.553

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	18.9	Minimum of Log Data	2.939
Maximum	85	Maximum of Log Data	4.443
Mean	58.37	Mean of log Data	4.013
Median	59.44	SD of log Data	0.367
SD	17.24		
Coefficient of Variation	0.295		
Skewness	-0.517		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.968	Shapiro Wilk Test Statistic	0.865
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	65.67	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	70.53
95% Adjusted-CLT UCL (Chen-1995)	64.69	95% Chebyshev (MVUE) UCL	82.21
95% Modified-t UCL (Johnson-1978)	65.59	97.5% Chebyshev (MVUE) UCL	92.28
		99% Chebyshev (MVUE) UCL	112.1

Gamma Distribution Test

k star (bias corrected)	7.856	Data Distribution	
Theta Star	7.43	Data appear Normal at 5% Significance Level	
MLE of Mean	58.37		
MLE of Standard Deviation	20.83		
nu star	267.1		
Approximate Chi Square Value (.05)	230.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	65.25
Adjusted Chi Square Value	226.7	95% Jackknife UCL	65.67
		95% Standard Bootstrap UCL	65.06
Anderson-Darling Test Statistic	0.486	95% Bootstrap-t UCL	65.1
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	64.72
Kolmogorov-Smirnov Test Statistic	0.19	95% Percentile Bootstrap UCL	64.54
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	64.47
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	76.6
		97.5% Chebyshev(Mean, Sd) UCL	84.49
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	99.99
95% Approximate Gamma UCL	67.71		
95% Adjusted Gamma UCL	68.78		

Potential UCL to Use

Use 95% Student's-t UCL 65.67

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

Minimum	2.2	Log-transformed Statistics	
Maximum	144	Minimum of Log Data	0.788
Mean	40.53	Maximum of Log Data	4.97
Median	40.53	Mean of log Data	3.405
SD	29.91	SD of log Data	0.957
Coefficient of Variation	0.738		
Skewness	2.596		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.561	Shapiro Wilk Test Statistic	0.653
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	53.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	88.85
95% Adjusted-CLT UCL (Chen-1995)	57.34	95% Chebyshev (MVUE) UCL	96.88
95% Modified-t UCL (Johnson-1978)	53.95	97.5% Chebyshev (MVUE) UCL	118.9
		99% Chebyshev (MVUE) UCL	162.3

Gamma Distribution Test

k star (bias corrected)	1.551	Data Distribution	
Theta Star	26.13	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	40.53		
MLE of Standard Deviation	32.54		
nu star	52.72		
Approximate Chi Square Value (.05)	37.04	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	52.46
Adjusted Chi Square Value	35.67	95% Jackknife UCL	53.19
		95% Standard Bootstrap UCL	52.55
Anderson-Darling Test Statistic	3.027	95% Bootstrap-t UCL	59.15
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	110.5
Kolmogorov-Smirnov Test Statistic	0.422	95% Percentile Bootstrap UCL	52.7
Kolmogorov-Smirnov 5% Critical Value	0.212	95% BCA Bootstrap UCL	59.29
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	72.15
		97.5% Chebyshev(Mean, Sd) UCL	85.83
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	112.7
95% Approximate Gamma UCL	57.68		
95% Adjusted Gamma UCL	59.9		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 72.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

Minimum	7202	Log-transformed Statistics	
Maximum	79900	Minimum of Log Data	8.882
Mean	20319	Maximum of Log Data	11.29
Median	14694	Mean of log Data	9.735
SD	17279	SD of log Data	0.546
Coefficient of Variation	0.85		
Skewness	3.001		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.566	Shapiro Wilk Test Statistic	0.789
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	27635	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	26048
95% Adjusted-CLT UCL (Chen-1995)	30471	95% Chebyshev (MVUE) UCL	31052
95% Modified-t UCL (Johnson-1978)	28144	97.5% Chebyshev (MVUE) UCL	36085
		99% Chebyshev (MVUE) UCL	45973

Gamma Distribution Test

k star (bias corrected)	2.402	Data Distribution	
Theta Star	8461	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	20319		
MLE of Standard Deviation	13111		
nu star	81.65		
Approximate Chi Square Value (.05)	61.83	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	27212
Adjusted Chi Square Value	60.02	95% Jackknife UCL	27635
		95% Standard Bootstrap UCL	26953
Anderson-Darling Test Statistic	2.111	95% Bootstrap-t UCL	46521
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	57290
Kolmogorov-Smirnov Test Statistic	0.324	95% Percentile Bootstrap UCL	27536
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL	31428
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38586
		97.5% Chebyshev(Mean, Sd) UCL	46490
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	62016
95% Approximate Gamma UCL	26833		
95% Adjusted Gamma UCL	27640		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 38586

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	150	Minimum of Log Data	5.011
Maximum	13100	Maximum of Log Data	9.48
Mean	1108	Mean of log Data	5.938
Median	325.6	SD of log Data	1.06
SD	3100		
Coefficient of Variation	2.799		
Skewness	4.082		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.319	Shapiro Wilk Test Statistic	0.727
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	2420	95% H-UCL	1382
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1425
95% Adjusted-CLT UCL (Chen-1995)	3139	97.5% Chebyshev (MVUE) UCL	1767
95% Modified-t UCL (Johnson-1978)	2544	99% Chebyshev (MVUE) UCL	2440

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.516	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2145		
MLE of Mean	1108		
MLE of Standard Deviation	1541		
nu star	17.56		
Approximate Chi Square Value (.05)	9.071	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	2344
Adjusted Chi Square Value	8.437	95% Jackknife UCL	2420
		95% Standard Bootstrap UCL	2313
Anderson-Darling Test Statistic	3.253	95% Bootstrap-t UCL	18826
Anderson-Darling 5% Critical Value	0.791	95% Hall's Bootstrap UCL	9631
Kolmogorov-Smirnov Test Statistic	0.376	95% Percentile Bootstrap UCL	2580
Kolmogorov-Smirnov 5% Critical Value	0.22	95% BCA Bootstrap UCL	3375
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4385
		97.5% Chebyshev(Mean, Sd) UCL	5803
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8588
95% Approximate Gamma UCL	2144		
95% Adjusted Gamma UCL	2305		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 4385

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 7

Raw Statistics

Minimum	0.0121	Log-transformed Statistics	
Maximum	12.29	Minimum of Log Data	-4.415
Mean	8.617	Maximum of Log Data	2.509
Median	10	Mean of log Data	1.583
SD	3.398	SD of log Data	1.969
Coefficient of Variation	0.394		
Skewness	-2.147		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.611	Shapiro Wilk Test Statistic	0.442
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.06	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	285.2
95% Adjusted-CLT UCL (Chen-1995)	9.514	95% Chebyshev (MVUE) UCL	90.16
95% Modified-t UCL (Johnson-1978)	9.985	97.5% Chebyshev (MVUE) UCL	117.9
		99% Chebyshev (MVUE) UCL	172.5

Gamma Distribution Test

k star (bias corrected)	0.871	Data Distribution	
Theta Star	9.89	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.617		
MLE of Standard Deviation	9.232		
nu star	29.62		
Approximate Chi Square Value (.05)	18.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	9.973
Adjusted Chi Square Value	17.26	95% Jackknife UCL	10.06
		95% Standard Bootstrap UCL	9.942
Anderson-Darling Test Statistic	4.785	95% Bootstrap-t UCL	9.665
Anderson-Darling 5% Critical Value	0.766	95% Hall's Bootstrap UCL	9.551
Kolmogorov-Smirnov Test Statistic	0.455	95% Percentile Bootstrap UCL	9.811
Kolmogorov-Smirnov 5% Critical Value	0.215	95% BCA Bootstrap UCL	9.653
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.21
		97.5% Chebyshev(Mean, Sd) UCL	13.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.82
95% Approximate Gamma UCL	14.03		
95% Adjusted Gamma UCL	14.79		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 16.82

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	7.7 Minimum of Log Data	2.041
Maximum	139 Maximum of Log Data	4.934
Mean	65.56 Mean of log Data	4.038
Median	65 SD of log Data	0.678
SD	27.45	
Coefficient of Variation	0.419	
Skewness	0.246	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.735 Shapiro Wilk Test Statistic	0.608
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	77.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	104.2
95% Adjusted-CLT UCL (Chen-1995)	76.94	95% Chebyshev (MVUE) UCL	123.5
95% Modified-t UCL (Johnson-1978)	77.25	97.5% Chebyshev (MVUE) UCL	146.5
		99% Chebyshev (MVUE) UCL	191.8

Gamma Distribution Test

k star (bias corrected)	3.008	Data Distribution	
Theta Star	21.8	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	65.56		
MLE of Standard Deviation	37.8		
nu star	102.3		
Approximate Chi Square Value (.05)	79.93	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	76.52
Adjusted Chi Square Value	77.86	95% Jackknife UCL	77.19
		95% Standard Bootstrap UCL	76.2
Anderson-Darling Test Statistic	2.927	95% Bootstrap-t UCL	76.94
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	80.09
Kolmogorov-Smirnov Test Statistic	0.432	95% Percentile Bootstrap UCL	76.38
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	77.41
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.59
		97.5% Chebyshev(Mean, Sd) UCL	107.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	131.8
95% Approximate Gamma UCL	83.88		
95% Adjusted Gamma UCL	86.11		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 94.59

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data -1.139
Maximum	5	Maximum of Log Data 1.609
Mean	4.082	Mean of log Data 1.229
Median	4.082	SD of log Data 0.817
SD	1.452	
Coefficient of Variation	0.356	
Skewness	-2.153	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic 0.489
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value 0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	4.697	95% H-UCL 7.758
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 8.985
95% Adjusted-CLT UCL (Chen-1995)	4.465	97.5% Chebyshev (MVUE) UCL 10.86
95% Modified-t UCL (Johnson-1978)	4.666	99% Chebyshev (MVUE) UCL 14.54

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.483	Data do not follow a Discernable Distribution (0.05)
Theta Star	1.644	
MLE of Mean	4.082	
MLE of Standard Deviation	2.59	
nu star	84.44	
Approximate Chi Square Value (.05)	64.26	Nonparametric Statistics
Adjusted Level of Significance	0.0346	95% CLT UCL 4.661
Adjusted Chi Square Value	62.41	95% Jackknife UCL 4.697
		95% Standard Bootstrap UCL 4.64
Anderson-Darling Test Statistic	3.763	95% Bootstrap-t UCL 4.532
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL 4.512
Kolmogorov-Smirnov Test Statistic	0.46	95% Percentile Bootstrap UCL 4.568
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL 4.514
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 5.617
		97.5% Chebyshev(Mean, Sd) UCL 6.281
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 7.586
95% Approximate Gamma UCL	5.364	
95% Adjusted Gamma UCL	5.522	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.617

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Silver

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.023	Minimum of Log Data	-3.772
Maximum	10	Maximum of Log Data	2.303
Mean	7.497	Mean of log Data	0.999
Median	10	SD of log Data	2.396
SD	4.299		
Coefficient of Variation	0.573		
Skewness	-1.308		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.583	Shapiro Wilk Test Statistic	0.572
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.317	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1037
95% Adjusted-CLT UCL (Chen-1995)	8.858	95% Chebyshev (MVUE) UCL	118.6
95% Modified-t UCL (Johnson-1978)	9.262	97.5% Chebyshev (MVUE) UCL	157.1
		99% Chebyshev (MVUE) UCL	232.5

Gamma Distribution Test

k star (bias corrected)	0.539	Data Distribution	
Theta Star	13.9	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.497		
MLE of Standard Deviation	10.21		
nu star	18.34		
Approximate Chi Square Value (.05)	9.639	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	9.212
Adjusted Chi Square Value	8.983	95% Jackknife UCL	9.317
		95% Standard Bootstrap UCL	9.147
Anderson-Darling Test Statistic	4.178	95% Bootstrap-t UCL	9.005
Anderson-Darling 5% Critical Value	0.789	95% Hall's Bootstrap UCL	8.85
Kolmogorov-Smirnov Test Statistic	0.444	95% Percentile Bootstrap UCL	9.104
Kolmogorov-Smirnov 5% Critical Value	0.219	95% BCA Bootstrap UCL	8.798
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.04
		97.5% Chebyshev(Mean, Sd) UCL	14.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.87
95% Approximate Gamma UCL	14.27		
95% Adjusted Gamma UCL	15.31		

Potential UCL to Use

		Use 99% Chebyshev (Mean, Sd) UCL	17.87
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.13	Minimum of Log Data	-2.04
Maximum	2.4	Maximum of Log Data	0.875
Mean	0.725	Mean of log Data	-0.513
Median	0.725	SD of log Data	0.686
SD	0.484		
Coefficient of Variation	0.667		
Skewness	2.612		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.556	Shapiro Wilk Test Statistic	0.673
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.93	95% H-UCL	1.112
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.316
95% Adjusted-CLT UCL (Chen-1995)	0.997	97.5% Chebyshev (MVUE) UCL	1.563
95% Modified-t UCL (Johnson-1978)	0.942	99% Chebyshev (MVUE) UCL	2.049

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.315	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.313		
MLE of Mean	0.725		
MLE of Standard Deviation	0.477		
nu star	78.69		
Approximate Chi Square Value (.05)	59.26	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	0.918
Adjusted Chi Square Value	57.49	95% Jackknife UCL	0.93
		95% Standard Bootstrap UCL	0.907
Anderson-Darling Test Statistic	3.034	95% Bootstrap-t UCL	1.027
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	1.853
Kolmogorov-Smirnov Test Statistic	0.404	95% Percentile Bootstrap UCL	0.926
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL	1.021
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.236
		97.5% Chebyshev(Mean, Sd) UCL	1.458
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.892
95% Approximate Gamma UCL	0.963		
95% Adjusted Gamma UCL	0.992		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 1.236

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

17 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	1.3	Minimum of Log Data	0.262
Maximum	20	Maximum of Log Data	2.996
Mean	12.24	Mean of log Data	2.354
Median	12.24	SD of log Data	0.667
SD	5.625		
Coefficient of Variation	0.46		
Skewness	0.00537		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.93	Shapiro Wilk Test Statistic	0.802
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	14.62	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	19.02
95% Adjusted-CLT UCL (Chen-1995)	14.49	95% Chebyshev (MVUE) UCL	22.57
95% Modified-t UCL (Johnson-1978)	14.62	97.5% Chebyshev (MVUE) UCL	26.74
		99% Chebyshev (MVUE) UCL	34.92

Gamma Distribution Test

k star (bias corrected)	2.898	Data Distribution	
Theta Star	4.224	Data appear Normal at 5% Significance Level	
MLE of Mean	12.24		
MLE of Standard Deviation	7.191		
nu star	98.53		
Approximate Chi Square Value (.05)	76.63	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	14.49
Adjusted Chi Square Value	74.61	95% Jackknife UCL	14.62
		95% Standard Bootstrap UCL	14.38
Anderson-Darling Test Statistic	0.563	95% Bootstrap-t UCL	14.8
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	14.49
Kolmogorov-Smirnov Test Statistic	0.15	95% Percentile Bootstrap UCL	14.53
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	14.34
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	18.19
		97.5% Chebyshev(Mean, Sd) UCL	20.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	25.82
95% Approximate Gamma UCL	15.74		
95% Adjusted Gamma UCL	16.17		

Potential UCL to Use

Use 95% Student's-t UCL 14.62

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

17 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

Minimum	10.4	Log-transformed Statistics	
Maximum	108	Minimum of Log Data	2.342
Mean	45.68	Maximum of Log Data	4.682
Median	45.68	Mean of log Data	3.742
SD	18.65	SD of log Data	0.445
Coefficient of Variation	0.408		
Skewness	2.079		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Test Statistic	0.611
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	53.57	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	58.03
95% Adjusted-CLT UCL (Chen-1995)	55.55	95% Chebyshev (MVUE) UCL	68.59
95% Modified-t UCL (Johnson-1978)	53.95	97.5% Chebyshev (MVUE) UCL	78.25
		99% Chebyshev (MVUE) UCL	97.23

Gamma Distribution Test

k star (bias corrected)	5.334	Data Distribution	
Theta Star	8.563	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	45.68		
MLE of Standard Deviation	19.78		
nu star	181.3		
Approximate Chi Square Value (.05)	151.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	53.12
Adjusted Chi Square Value	148.3	95% Jackknife UCL	53.57
		95% Standard Bootstrap UCL	52.92
Anderson-Darling Test Statistic	3.252	95% Bootstrap-t UCL	55.95
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	95.39
Kolmogorov-Smirnov Test Statistic	0.389	95% Percentile Bootstrap UCL	53.01
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	55.78
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	65.39
		97.5% Chebyshev(Mean, Sd) UCL	73.92
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	90.68
95% Approximate Gamma UCL	54.78		
95% Adjusted Gamma UCL	55.85		

Potential UCL to Use

Use 95% Student's-t UCL 53.57
or 95% Modified-t UCL 53.95

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File

221-01.wst

Full Precision

OFF

Confidence Coefficient

95%

Number of Bootstrap Operations

2000

Barium

General Statistics

Number of Valid Observations

17 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Barium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 14

Raw Statistics

Minimum	18.9	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.939
Mean	62.41	Maximum of Log Data	4.443
Median	62.26	Mean of log Data	4.079
SD	18.22	SD of log Data	0.373
Coefficient of Variation	0.292		
Skewness	-0.646		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.822
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.12	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	75.8
95% Adjusted-CLT UCL (Chen-1995)	68.94	95% Chebyshev (MVUE) UCL	88.47
95% Modified-t UCL (Johnson-1978)	70.01	97.5% Chebyshev (MVUE) UCL	99.44
		99% Chebyshev (MVUE) UCL	121

Gamma Distribution Test

k star (bias corrected)	7.764	Data Distribution	
Theta Star	8.038	Data appear Normal at 5% Significance Level	
MLE of Mean	62.41		
MLE of Standard Deviation	22.4		
nu star	264		
Approximate Chi Square Value (.05)	227.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	69.68
Adjusted Chi Square Value	223.8	95% Jackknife UCL	70.12
		95% Standard Bootstrap UCL	69.36
Anderson-Darling Test Statistic	0.617	95% Bootstrap-t UCL	69.74
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	69.24
Kolmogorov-Smirnov Test Statistic	0.179	95% Percentile Bootstrap UCL	69.25
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	68.99
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.67
		97.5% Chebyshev(Mean, Sd) UCL	90.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.4
95% Approximate Gamma UCL	72.46		
95% Adjusted Gamma UCL	73.61		

Potential UCL to Use

Use 95% Student's-t UCL 70.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	7202	Minimum of Log Data	8.882
Maximum	43476	Maximum of Log Data	10.68
Mean	15784	Mean of log Data	9.6
Median	14694	SD of log Data	0.343
SD	7537		
Coefficient of Variation	0.477		
Skewness	3.385		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.556	Shapiro Wilk Test Statistic	0.757
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	18976	95% H-UCL	18430
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21365
95% Adjusted-CLT UCL (Chen-1995)	20394	97.5% Chebyshev (MVUE) UCL	23857
95% Modified-t UCL (Johnson-1978)	19226	99% Chebyshev (MVUE) UCL	28752

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	6.345	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2488		
MLE of Mean	15784		
MLE of Standard Deviation	6266		
nu star	215.7		
Approximate Chi Square Value (.05)	182.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	18791
Adjusted Chi Square Value	179.6	95% Jackknife UCL	18976
		95% Standard Bootstrap UCL	18724
Anderson-Darling Test Statistic	1.97	95% Bootstrap-t UCL	23552
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	33029
Kolmogorov-Smirnov Test Statistic	0.293	95% Percentile Bootstrap UCL	19262
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	20537
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23752
		97.5% Chebyshev(Mean, Sd) UCL	27200
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	33972
95% Approximate Gamma UCL	18634		
95% Adjusted Gamma UCL	18964		

Potential UCL to Use

Use 95% Student's-t UCL 18976
or 95% Modified-t UCL 19226

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	7.7 Minimum of Log Data	2.041
Maximum	80.29 Maximum of Log Data	4.386
Mean	63.25 Mean of log Data	4.071
Median	65 SD of log Data	0.528
SD	15.14	
Coefficient of Variation	0.239	
Skewness	-3.319	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.464 Shapiro Wilk Test Statistic	0.344
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	69.66 95% H-UCL	88.46
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	105.4
95% Adjusted-CLT UCL (Chen-1995)	66.13 97.5% Chebyshev (MVUE) UCL	122.1
95% Modified-t UCL (Johnson-1978)	69.17 99% Chebyshev (MVUE) UCL	154.9

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	5.598 Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.3	
MLE of Mean	63.25	
MLE of Standard Deviation	26.73	
nu star	190.3	

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0346	Nonparametric Statistics	
Adjusted Chi Square Value	156.5	95% CLT UCL	69.29
		95% Jackknife UCL	69.66
		95% Standard Bootstrap UCL	69.03
Anderson-Darling Test Statistic	4.822	95% Bootstrap-t UCL	67.6
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	67.15
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	67.7
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	67.25
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	79.26
		97.5% Chebyshev(Mean, Sd) UCL	86.18
		99% Chebyshev(Mean, Sd) UCL	99.78

Assuming Gamma Distribution

95% Approximate Gamma UCL	75.52	
95% Adjusted Gamma UCL	76.95	

Potential UCL to Use

	Use 95% Chebyshev (Mean, Sd) UCL	79.26
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data	-1.139
Maximum	5	Maximum of Log Data	1.609
Mean	4.082	Mean of log Data	1.229
Median	4.082	SD of log Data	0.817
SD	1.452		
Coefficient of Variation	0.356		
Skewness	-2.153		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.489
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.697	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.758
95% Adjusted-CLT UCL (Chen-1995)	4.465	95% Chebyshev (MVUE) UCL	8.985
95% Modified-t UCL (Johnson-1978)	4.666	97.5% Chebyshev (MVUE) UCL	10.86
		99% Chebyshev (MVUE) UCL	14.54

Gamma Distribution Test

k star (bias corrected)	2.483	Data Distribution	
Theta Star	1.644	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.082		
MLE of Standard Deviation	2.59		
nu star	84.44		
Approximate Chi Square Value (.05)	64.26	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	4.661
Adjusted Chi Square Value	62.41	95% Jackknife UCL	4.697
		95% Standard Bootstrap UCL	4.632
Anderson-Darling Test Statistic	3.763	95% Bootstrap-t UCL	4.563
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	4.512
Kolmogorov-Smirnov Test Statistic	0.46	95% Percentile Bootstrap UCL	4.568
Kolmogorov-Smirnov 5% Critical Value	0.211	95% BCA Bootstrap UCL	4.509
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.617
		97.5% Chebyshev(Mean, Sd) UCL	6.281
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.586
95% Approximate Gamma UCL	5.364		
95% Adjusted Gamma UCL	5.522		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.617

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

17 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 12

Raw Statistics

Minimum	5.79	Log-transformed Statistics	
Maximum	20	Minimum of Log Data	1.756
Mean	14.15	Maximum of Log Data	2.996
Median	13.57	Mean of log Data	2.576
SD	5.192	SD of log Data	0.412
Coefficient of Variation	0.367		
Skewness	-0.131		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.872	Shapiro Wilk Test Statistic	0.878
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16.35	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17.5
95% Adjusted-CLT UCL (Chen-1995)	16.18	95% Chebyshev (MVUE) UCL	20.58
95% Modified-t UCL (Johnson-1978)	16.35	97.5% Chebyshev (MVUE) UCL	23.32
		99% Chebyshev (MVUE) UCL	28.71

Gamma Distribution Test

k star (bias corrected)	5.77	Data Distribution	
Theta Star	2.453	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	14.15		
MLE of Standard Deviation	5.892		
nu star	196.2		
Approximate Chi Square Value (.05)	164.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	16.23
Adjusted Chi Square Value	161.8	95% Jackknife UCL	16.35
		95% Standard Bootstrap UCL	16.17
Anderson-Darling Test Statistic	0.791	95% Bootstrap-t UCL	16.3
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	16.03
Kolmogorov-Smirnov Test Statistic	0.215	95% Percentile Bootstrap UCL	16.11
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	16.14
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	19.64
		97.5% Chebyshev(Mean, Sd) UCL	22.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26.68
95% Approximate Gamma UCL	16.85		
95% Adjusted Gamma UCL	17.17		

Potential UCL to Use

Use 95% Student's-t UCL 16.35
or 95% Modified-t UCL 16.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

17 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	222-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	3110	Log-transformed Statistics	
Maximum	14200	Minimum of Log Data	8.042
Mean	9530	Maximum of Log Data	9.561
Median	10197	Mean of log Data	9.1
SD	2951	SD of log Data	0.409
Coefficient of Variation	0.31		
Skewness	-0.866		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.917	Shapiro Wilk Test Statistic	0.793
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11060	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12508
95% Adjusted-CLT UCL (Chen-1995)	10703	95% Chebyshev (MVUE) UCL	14712
95% Modified-t UCL (Johnson-1978)	11024	97.5% Chebyshev (MVUE) UCL	16897
		99% Chebyshev (MVUE) UCL	21191

Gamma Distribution Test

k star (bias corrected)	6.178	Data Distribution	
Theta Star	1543	Data appear Normal at 5% Significance Level	
MLE of Mean	9530		
MLE of Standard Deviation	3834		
nu star	148.3		
Approximate Chi Square Value (.05)	121.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10931
Adjusted Chi Square Value	117.4	95% Jackknife UCL	11060
		95% Standard Bootstrap UCL	10868
Anderson-Darling Test Statistic	0.898	95% Bootstrap-t UCL	10805
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10841
Kolmogorov-Smirnov Test Statistic	0.271	95% Percentile Bootstrap UCL	10778
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	10691
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13243
		97.5% Chebyshev(Mean, Sd) UCL	14849
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18005
95% Approximate Gamma UCL	11665		
95% Adjusted Gamma UCL	12037		

Potential UCL to Use

		Use 95% Student's-t UCL	11060
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	4 Minimum of Log Data	1.386
Maximum	11.84 Maximum of Log Data	2.471
Mean	8.904 Mean of log Data	2.14
Median	9.47 SD of log Data	0.341
SD	2.463	
Coefficient of Variation	0.277	
Skewness	-1.01	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.898 Shapiro Wilk Test Statistic	0.813
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.18 95% H-UCL	11.03
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12.86
95% Adjusted-CLT UCL (Chen-1995)	9.852 97.5% Chebyshev (MVUE) UCL	14.54
95% Modified-t UCL (Johnson-1978)	10.15 99% Chebyshev (MVUE) UCL	17.85

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	8.31 Data appear Normal at 5% Significance Level	
Theta Star	1.072	
MLE of Mean	8.904	
MLE of Standard Deviation	3.089	
nu star	199.4	
Approximate Chi Square Value (.05)	167.8 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	10.07
Adjusted Chi Square Value	163.3 95% Jackknife UCL	10.18
	95% Standard Bootstrap UCL	10.02
Anderson-Darling Test Statistic	0.808 95% Bootstrap-t UCL	9.984
Anderson-Darling 5% Critical Value	0.73 95% Hall's Bootstrap UCL	9.883
Kolmogorov-Smirnov Test Statistic	0.234 95% Percentile Bootstrap UCL	9.997
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	9.874
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12
	97.5% Chebyshev(Mean, Sd) UCL	13.34
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	15.98
95% Approximate Gamma UCL	10.59	
95% Adjusted Gamma UCL	10.87	

Potential UCL to Use

Use 95% Student's-t UCL 10.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics
Minimum	-0.0143 Log Statistics Not Available
Maximum	0.393
Mean	0.189
Median	0.189
SD	0.0868
Coefficient of Variation	0.459
Skewness	-1.73E-15

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.6 Not Available
Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.234 95% H-UCL	N/A
Assuming Normal Distribution	95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.234 95% Adjusted-CLT UCL (Chen 1995)	0.231
	95% Modified-t UCL (Johnson-1978)	0.234

Gamma Distribution Test
 Gamma Statistics Not Available
 Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use		
Use 95% Chebyshev (Mean, Sd) UCL	0.299	95% CLT UCL 0.231
		95% Jackknife UCL 0.234
		95% Standard Bootstrap UCL N/A
		95% Bootstrap-t UCL N/A
		95% Hall's Bootstrap UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% Chebyshev(Mean, Sd) UCL 0.299
		97.5% Chebyshev(Mean, Sd) UCL 0.346
		99% Chebyshev(Mean, Sd) UCL 0.439

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 10

Raw Statistics

Minimum	12.8	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.549
Mean	50.13	Maximum of Log Data	4.443
Median	43.65	Mean of log Data	3.726
SD	28.21	SD of log Data	0.689
Coefficient of Variation	0.563		
Skewness	0.0748		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.885	Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.76	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	86.63
95% Adjusted-CLT UCL (Chen-1995)	63.72	95% Chebyshev (MVUE) UCL	97.85
95% Modified-t UCL (Johnson-1978)	64.79	97.5% Chebyshev (MVUE) UCL	117.9
		99% Chebyshev (MVUE) UCL	157.4

Gamma Distribution Test

k star (bias corrected)	2.165	Data Distribution	
Theta Star	23.16	Data appear Normal at 5% Significance Level	
MLE of Mean	50.13		
MLE of Standard Deviation	34.07		
nu star	51.96		
Approximate Chi Square Value (.05)	36.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	63.53
Adjusted Chi Square Value	34.42	95% Jackknife UCL	64.76
		95% Standard Bootstrap UCL	63.2
Anderson-Darling Test Statistic	0.486	95% Bootstrap-t UCL	65.59
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	61.7
Kolmogorov-Smirnov Test Statistic	0.167	95% Percentile Bootstrap UCL	63.76
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	62.77
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	85.63
		97.5% Chebyshev(Mean, Sd) UCL	101
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	131.2
95% Approximate Gamma UCL	71.56		
95% Adjusted Gamma UCL	75.67		

Potential UCL to Use

Use 95% Student's-t UCL 64.76

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt-60 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	223.2	Minimum of Log Data	5.408
Maximum	889	Maximum of Log Data	6.79
Mean	515.5	Mean of log Data	6.153
Median	491.3	SD of log Data	0.456
SD	226.3		
Coefficient of Variation	0.439		
Skewness	4.79E-01		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	632.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	694.7
95% Adjusted-CLT UCL (Chen-1995)	632.6	95% Chebyshev (MVUE) UCL	818.8
95% Modified-t UCL (Johnson-1978)	634.3	97.5% Chebyshev (MVUE) UCL	949.5
		99% Chebyshev (MVUE) UCL	1206

Gamma Distribution Test

k star (bias corrected)	4.243	Data Distribution	
Theta Star	121.5	Data appear Normal at 5% Significance Level	
MLE of Mean	515.5		
MLE of Standard Deviation	250.2		
nu star	101.8		
Approximate Chi Square Value (.05)	79.55	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	622.9
Adjusted Chi Square Value	76.55	95% Jackknife UCL	632.8
		95% Standard Bootstrap UCL	616.7
Anderson-Darling Test Statistic	0.231	95% Bootstrap-t UCL	647.4
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	622
Kolmogorov-Smirnov Test Statistic	0.136	95% Percentile Bootstrap UCL	616.1
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	629
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	800.3
		97.5% Chebyshev(Mean, Sd) UCL	923.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1166
95% Approximate Gamma UCL	659.9		
95% Adjusted Gamma UCL	685.7		

Potential UCL to Use

Use 95% Student's-t UCL 632.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 11

Raw Statistics

Minimum	9	Minimum of Log Data	2.197
Maximum	91.9	Maximum of Log Data	4.521
Mean	57.51	Mean of log Data	3.817
Median	65	SD of log Data	0.849
SD	29.33		
Coefficient of Variation	0.51		
Skewness	-0.894		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Test Statistic	0.722
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	72.71	95% H-UCL	128.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	133.5
95% Adjusted-CLT UCL (Chen-1995)	69.1	97.5% Chebyshev (MVUE) UCL	164.1
95% Modified-t UCL (Johnson-1978)	72.35	99% Chebyshev (MVUE) UCL	224.2

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	1.766	Data Distribution	
Theta Star	32.56	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	57.51		
MLE of Standard Deviation	43.27		
nu star	42.38		
Approximate Chi Square Value (.05)	28.46	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	71.44
Adjusted Chi Square Value	26.73	95% Jackknife UCL	72.71
		95% Standard Bootstrap UCL	70.94
Anderson-Darling Test Statistic	1.488	95% Bootstrap-t UCL	70.09
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	68.71
Kolmogorov-Smirnov Test Statistic	0.363	95% Percentile Bootstrap UCL	69.9
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	68.97
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.41
		97.5% Chebyshev(Mean, Sd) UCL	110.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	141.8
95% Approximate Gamma UCL	85.65		
95% Adjusted Gamma UCL	91.2		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 94.41

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

Minimum	0.08	Log-transformed Statistics	
Maximum	1.4	Minimum of Log Data	-2.526
Mean	0.57	Maximum of Log Data	0.336
Median	0.574	Mean of log Data	-0.746
SD	0.315	SD of log Data	0.727
Coefficient of Variation	0.554		
Skewness	1.349		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.688	Shapiro Wilk Test Statistic	0.687
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.733	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.058
95% Adjusted-CLT UCL (Chen-1995)	0.757	95% Chebyshev (MVUE) UCL	1.177
95% Modified-t UCL (Johnson-1978)	0.739	97.5% Chebyshev (MVUE) UCL	1.426
		99% Chebyshev (MVUE) UCL	1.914

Gamma Distribution Test

k star (bias corrected)	2.221	Data Distribution	
Theta Star	0.256	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.57		
MLE of Standard Deviation	0.382		
nu star	53.31	Nonparametric Statistics	
Approximate Chi Square Value (.05)	37.53	95% CLT UCL	0.719
Adjusted Level of Significance	0.029	95% Jackknife UCL	0.733
Adjusted Chi Square Value	35.52	95% Standard Bootstrap UCL	0.711
		95% Bootstrap-t UCL	0.771
Anderson-Darling Test Statistic	1.976	95% Hall's Bootstrap UCL	1.559
Anderson-Darling 5% Critical Value	0.739	95% Percentile Bootstrap UCL	0.714
Kolmogorov-Smirnov Test Statistic	0.417	95% BCA Bootstrap UCL	0.749
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Chebyshev(Mean, Sd) UCL	0.967
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	1.138
		99% Chebyshev(Mean, Sd) UCL	1.476
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.809		
95% Adjusted Gamma UCL	0.855		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.967

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

Minimum	1.1	Minimum of Log Data	0.0953
Maximum	58.6	Maximum of Log Data	4.071
Mean	17	Mean of log Data	2.479
Median	15.84	SD of log Data	0.995
SD	14.75		
Coefficient of Variation	0.868		
Skewness	2.193		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test	0.744	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.859	Shapiro Wilk Test Statistic	0.878
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	24.65	95% H-UCL	46.86
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	43.32
95% Adjusted-CLT UCL (Chen-1995)	26.88	97.5% Chebyshev (MVUE) UCL	54.04
95% Modified-t UCL (Johnson-1978)	25.09	99% Chebyshev (MVUE) UCL	75.12

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	1.225	Data Distribution	
Theta Star	13.88	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	17		
MLE of Standard Deviation	15.36		
nu star	29.4		
Approximate Chi Square Value (.05)	18.02	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	24
Adjusted Chi Square Value	16.67	95% Jackknife UCL	24.65
		95% Standard Bootstrap UCL	23.8
Anderson-Darling Test Statistic	0.587	95% Bootstrap-t UCL	30.42
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	55.72
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	24.15
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	26.76
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	35.56
		97.5% Chebyshev(Mean, Sd) UCL	43.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	59.36
95% Approximate Gamma UCL	27.73		
95% Adjusted Gamma UCL	29.97		

Potential UCL to Use

Use 95% Approximate Gamma UCL 27.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	1.77	Log-transformed Statistics	
Maximum	10.4	Minimum of Log Data	0.571
Mean	6.085	Maximum of Log Data	2.342
Median	6.085	Mean of log Data	1.748
SD	1.84	SD of log Data	0.401
Coefficient of Variation	0.302		
Skewness	9.96E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.531
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.039	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.952
95% Adjusted-CLT UCL (Chen-1995)	6.959	95% Chebyshev (MVUE) UCL	9.347
95% Modified-t UCL (Johnson-1978)	7.039	97.5% Chebyshev (MVUE) UCL	10.72
		99% Chebyshev (MVUE) UCL	13.41

Gamma Distribution Test

k star (bias corrected)	6.617	Data Distribution	
Theta Star	0.92	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	6.085		
MLE of Standard Deviation	2.366		
nu star	158.8		
Approximate Chi Square Value (.05)	130.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	6.959
Adjusted Chi Square Value	126.8	95% Jackknife UCL	7.039
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.823	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.462	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.4
		97.5% Chebyshev(Mean, Sd) UCL	9.402
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.37
95% Approximate Gamma UCL	7.395		
95% Adjusted Gamma UCL	7.622		

Potential UCL to Use Use 95% Student's-t UCL 7.039
 or 95% Modified-t UCL 7.039

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	1.43	Minimum of Log Data	0.358
Maximum	19.6	Maximum of Log Data	2.976
Mean	10.52	Mean of log Data	2.238
Median	10.52	SD of log Data	0.619
SD	3.874		
Coefficient of Variation	0.368		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.52	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17.43
95% Adjusted-CLT UCL (Chen-1995)	12.35	95% Chebyshev (MVUE) UCL	20.13
95% Modified-t UCL (Johnson-1978)	12.52	97.5% Chebyshev (MVUE) UCL	24.02
		99% Chebyshev (MVUE) UCL	31.65

Gamma Distribution Test

k star (bias corrected)	3.454	Data Distribution	
Theta Star	3.044	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.52		
MLE of Standard Deviation	5.657		
nu star	82.91		
Approximate Chi Square Value (.05)	62.92	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12.35
Adjusted Chi Square Value	60.27	95% Jackknife UCL	12.52
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.93	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.479	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.39
		97.5% Chebyshev(Mean, Sd) UCL	17.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.64
95% Approximate Gamma UCL	13.85		
95% Adjusted Gamma UCL	14.46		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	15.39
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 222-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	14.1 Minimum of Log Data	2.646
Maximum	85 Maximum of Log Data	4.443
Mean	71.99 Mean of log Data	4.176
Median	85 SD of log Data	0.555
SD	24.64	
Coefficient of Variation	0.342	
Skewness	-1.68	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.603 Shapiro Wilk Test Statistic	0.573
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	84.76	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	109.9
95% Adjusted-CLT UCL (Chen-1995)		95% Chebyshev (MVUE) UCL	128.6
95% Modified-t UCL (Johnson-1978)	84.18	80 97.5% Chebyshev (MVUE) UCL	151.9
		99% Chebyshev (MVUE) UCL	197.6

Gamma Distribution Test

k star (bias corrected)	3.899	Data Distribution	
Theta Star	18.46	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	71.99		
MLE of Standard Deviation	36.46		
nu star	93.57		
Approximate Chi Square Value (.05)	72.26	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	83.69
Adjusted Chi Square Value	69.41	95% Jackknife UCL	84.76
		95% Standard Bootstrap UCL	82.39
Anderson-Darling Test Statistic	2.429	95% Bootstrap-t UCL	81.53
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	80.23
Kolmogorov-Smirnov Test Statistic	0.453	95% Percentile Bootstrap UCL	81.86
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	79.09
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	103
		97.5% Chebyshev(Mean, Sd) UCL	116.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	142.8
95% Approximate Gamma UCL	93.21		
95% Adjusted Gamma UCL	97.04		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 103

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

Minimum	9	Minimum of Log Data	2.197
Maximum	91.9	Maximum of Log Data	4.521
Mean	61.02	Mean of log Data	3.943
Median	65	SD of log Data	0.741
SD	25.17		
Coefficient of Variation	0.413		
Skewness	-1.359		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.756	Shapiro Wilk Test Statistic	0.621
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	74.07	95% H-UCL	118
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	130.4
95% Adjusted-CLT UCL (Chen-1995)	69.93	97.5% Chebyshev (MVUE) UCL	158.3
95% Modified-t UCL (Johnson-1978)	73.6	99% Chebyshev (MVUE) UCL	213

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	2.403	Data Distribution	
Theta Star	25.39	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.02		
MLE of Standard Deviation	39.36		
nu star	57.68		
Approximate Chi Square Value (.05)	41.22	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	72.98
Adjusted Chi Square Value	39.1	95% Jackknife UCL	74.07
		95% Standard Bootstrap UCL	72.58
Anderson-Darling Test Statistic	2.107	95% Bootstrap-t UCL	71.68
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	70.04
Kolmogorov-Smirnov Test Statistic	0.452	95% Percentile Bootstrap UCL	71.81
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	70.35
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	92.7
		97.5% Chebyshev(Mean, Sd) UCL	106.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	133.3
95% Approximate Gamma UCL	85.39		
95% Adjusted Gamma UCL	90.01		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 92.7

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable PCB, Total was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	9.6	Minimum of Log Data	2.262
Maximum	58.6	Maximum of Log Data	4.071
Mean	21.66	Mean of log Data	2.979
Median		20 SD of log Data	0.424
SD	12.19		
Coefficient of Variation	0.563		
Skewness	2.869		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.536	Shapiro Wilk Test Statistic	0.69
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	27.98	95% H-UCL	27.99
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	32.96
95% Adjusted-CLT UCL (Chen-1995)	30.56	97.5% Chebyshev (MVUE) UCL	37.98
95% Modified-t UCL (Johnson-1978)	28.46	99% Chebyshev (MVUE) UCL	47.85

Gamma Distribution Test

k star (bias corrected)	4.082	Data Distribution	
Theta Star	5.305	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	21.66		
MLE of Standard Deviation	10.72		
nu star	97.97		
Approximate Chi Square Value (.05)	76.14	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	27.44
Adjusted Chi Square Value	73.2	95% Jackknife UCL	27.98
		95% Standard Bootstrap UCL	27.38
Anderson-Darling Test Statistic	2.164	95% Bootstrap-t UCL	34.17
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	55.84
Kolmogorov-Smirnov Test Statistic	0.431	95% Percentile Bootstrap UCL	28.26
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	29.65
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	36.99
		97.5% Chebyshev(Mean, Sd) UCL	43.63
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	56.67
95% Approximate Gamma UCL	27.87		
95% Adjusted Gamma UCL	28.98		

Potential UCL to Use		Use 95% Student's-t UCL	27.98
		or 95% Modified-t UCL	28.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	227-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	37	Number of Distinct Observations	15
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Raw Statistics

Minimum	4.54	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.513
Mean	7.947	Maximum of Log Data	2.398
Median	7.947	Mean of log Data	2.046
SD	1.842	SD of log Data	0.24
Coefficient of Variation	0.232		
Skewness	0.203		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.873	Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.458	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.54
95% Adjusted-CLT UCL (Chen-1995)	8.456	95% Chebyshev (MVUE) UCL	9.34
95% Modified-t UCL (Johnson-1978)	8.46	97.5% Chebyshev (MVUE) UCL	9.939
		99% Chebyshev (MVUE) UCL	11.12

Gamma Distribution Test

k star (bias corrected)	17.04	Data Distribution	
Theta Star	0.466	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.947		
MLE of Standard Deviation	1.925		
nu star	1261		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0431	Nonparametric Statistics	
Adjusted Chi Square Value	1176	95% CLT UCL	8.445
		95% Jackknife UCL	8.458
		95% Standard Bootstrap UCL	8.425

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.909	95% Bootstrap-t UCL	8.452
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	8.457
Kolmogorov-Smirnov Test Statistic	0.253	95% Percentile Bootstrap UCL	8.441
Kolmogorov-Smirnov 5% Critical Value	0.145	95% BCA Bootstrap UCL	8.472
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.267

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.496	97.5% Chebyshev(Mean, Sd) UCL	9.838
95% Adjusted Gamma UCL	8.52	99% Chebyshev(Mean, Sd) UCL	10.96

Potential UCL to Use

		Use 95% Student's-t UCL	8.458
		or 95% Modified-t UCL	8.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.454	Minimum of Log Data	-0.79
Maximum	0.79	Maximum of Log Data	-0.236
Mean	0.537	Mean of log Data	-0.626
Median	0.537	SD of log Data	0.0781
SD	0.0477		
Coefficient of Variation	0.089		
Skewness	4.082		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.441	Shapiro Wilk Test Statistic	0.496
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.55	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.555	95% Chebyshev (MVUE) UCL	0.567
95% Modified-t UCL (Johnson-1978)	0.551	97.5% Chebyshev (MVUE) UCL	0.58
		99% Chebyshev (MVUE) UCL	0.605

Gamma Distribution Test

k star (bias corrected)	142.8	Data Distribution	
Theta Star	0.00376	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.537		
MLE of Standard Deviation	0.0449		
nu star	10570		
Approximate Chi Square Value (.05)	10332	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	0.55
Adjusted Chi Square Value	10322	95% Jackknife UCL	0.55
		95% Standard Bootstrap UCL	0.549
Anderson-Darling Test Statistic	8.063	95% Bootstrap-t UCL	0.558
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.611
Kolmogorov-Smirnov Test Statistic	0.408	95% Percentile Bootstrap UCL	0.551
Kolmogorov-Smirnov 5% Critical Value	0.144	95% BCA Bootstrap UCL	0.556
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.571
		97.5% Chebyshev(Mean, Sd) UCL	0.586
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.615
95% Approximate Gamma UCL	0.549		
95% Adjusted Gamma UCL	0.55		

Potential UCL to Use

Use 95% Student's-t UCL	0.55
or 95% Modified-t UCL	0.551

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics

Minimum -0.038
 Maximum 0.51
 Mean 0.113
 Median 0.113
 SD 0.0756
 Coefficient of Variation 0.668
 Skewness 3.821

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.399
 Shapiro Wilk Critical Value 0.936

Lognormal Distribution Test

Not Available

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.134

Assuming Normal Distribution

95% Student's-t UCL 0.134

Assuming Lognormal Distribution

95% H-UCL N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995) 0.142

95% Modified-t UCL (Johnson-1978) 0.135

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.167 95% CLT UCL 0.134

95% Jackknife UCL 0.134

95% Standard Bootstrap UCL 0.133

95% Bootstrap-t UCL 0.144

95% Hall's Bootstrap UCL 0.235

95% Percentile Bootstrap UCL 0.136

95% BCA Bootstrap UCL 0.143

95% Chebyshev(Mean, Sd) UCL 0.167

97.5% Chebyshev(Mean, Sd) UCL 0.191

99% Chebyshev(Mean, Sd) UCL 0.237

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 19

Raw Statistics

		Log-transformed Statistics	
Minimum	7.38	Minimum of Log Data	1.999
Maximum	85	Maximum of Log Data	4.443
Mean	41.32	Mean of log Data	3.619
Median	41.32	SD of log Data	0.509
SD	16.91		
Coefficient of Variation	0.409		
Skewness	0.787		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.761	Shapiro Wilk Test Statistic	0.728
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	46.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	50
95% Adjusted-CLT UCL (Chen-1995)	46.27	95% Chebyshev (MVUE) UCL	58.51
95% Modified-t UCL (Johnson-1978)	46.07	97.5% Chebyshev (MVUE) UCL	65.52
		99% Chebyshev (MVUE) UCL	79.29

Gamma Distribution Test

k star (bias corrected)	4.669	Data Distribution	
Theta Star	8.85	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	41.32		
MLE of Standard Deviation	19.12		
nu star	345.5		
Approximate Chi Square Value (.05)	303.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	45.89
Adjusted Chi Square Value	301.7	95% Jackknife UCL	46.01
		95% Standard Bootstrap UCL	45.84
Anderson-Darling Test Statistic	4.54	95% Bootstrap-t UCL	46.73
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	46.96
Kolmogorov-Smirnov Test Statistic	3.04E-01	95% Percentile Bootstrap UCL	45.82
Kolmogorov-Smirnov 5% Critical Value	0.145	95% BCA Bootstrap UCL	46.34
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	53.44
		97.5% Chebyshev(Mean, Sd) UCL	58.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	68.98
95% Approximate Gamma UCL	47.05		
95% Adjusted Gamma UCL	47.31		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 53.44

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics
Minimum	-0.0318 Log Statistics Not Available
Maximum	1.53E-02
Mean	-0.00478
Median	-0.00478
SD	0.00573
Coefficient of Variation	-1.198
Skewness	-1.763

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.372 Not Available
Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	-0.00319	95% H-UCL N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)
95% Student's-t UCL	-0.00319	95% Adjusted-CLT UCL (Chen 1995) -0.00353
		95% Modified-t UCL (Johnson-1978) -0.00324

Gamma Distribution Test
 Gamma Statistics Not Available
 Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use		
Use 95% Chebyshev (Mean, Sd) UCL	-6.78E-04	95% CLT UCL -0.00323
		95% Jackknife UCL -0.00319
		95% Standard Bootstrap UCL -0.00323
		95% Bootstrap-t UCL -0.00343
		95% Hall's Bootstrap UCL -0.00331
		95% Percentile Bootstrap UCL -0.00332
		95% BCA Bootstrap UCL -0.00368
		95% Chebyshev(Mean, Sd) UCL -6.78E-04
		97.5% Chebyshev(Mean, Sd) UCL 0.0011
		99% Chebyshev(Mean, Sd) UCL 0.00459

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 6

Raw Statistics		Log-transformed Statistics	
Minimum	4.83E-04	Minimum of Log Data	-7.635
Maximum	2.53	Maximum of Log Data	0.928
Mean	0.527	Mean of log Data	-1.012
Median	0.527	SD of log Data	1.395
SD	0.373		
Coefficient of Variation	0.708		
Skewness	4.252		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.381	Shapiro Wilk Test Statistic	0.437
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.631	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.876
95% Adjusted-CLT UCL (Chen-1995)	0.674	95% Chebyshev (MVUE) UCL	2.074
95% Modified-t UCL (Johnson-1978)	0.638	97.5% Chebyshev (MVUE) UCL	2.575
		99% Chebyshev (MVUE) UCL	3.559

Gamma Distribution Test

k star (bias corrected)	1.385	Data Distribution	
Theta Star	0.381	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.527		
MLE of Standard Deviation	0.448		
nu star	102.5		
Approximate Chi Square Value (.05)	80.12	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	0.628
Adjusted Chi Square Value	79.26	95% Jackknife UCL	0.631
		95% Standard Bootstrap UCL	0.631
Anderson-Darling Test Statistic	9.839	95% Bootstrap-t UCL	0.689
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	1.094
Kolmogorov-Smirnov Test Statistic	0.501	95% Percentile Bootstrap UCL	0.636
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	0.676
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.795
		97.5% Chebyshev(Mean, Sd) UCL	0.911
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.138
95% Approximate Gamma UCL	0.675		
95% Adjusted Gamma UCL	0.682		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.795

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 15

Raw Statistics

Minimum	7.21	Log-transformed Statistics	
Maximum	653	Minimum of Log Data	1.975
Mean	115.6	Maximum of Log Data	6.482
Median	115.6	Mean of log Data	4.338
SD	116.4	SD of log Data	1.036
Coefficient of Variation	1.008		
Skewness	3.209		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	147.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	199.2
95% Adjusted-CLT UCL (Chen-1995)	157.8	95% Chebyshev (MVUE) UCL	239.5
95% Modified-t UCL (Johnson-1978)	149.5	97.5% Chebyshev (MVUE) UCL	287.7
		99% Chebyshev (MVUE) UCL	382.4

Gamma Distribution Test

k star (bias corrected)	1.264	Data Distribution	
Theta Star	91.4	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	115.6		
MLE of Standard Deviation	102.8		
nu star	93.55		
Approximate Chi Square Value (.05)	72.25	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	147
Adjusted Chi Square Value	71.43	95% Jackknife UCL	147.9
		95% Standard Bootstrap UCL	146.4
Anderson-Darling Test Statistic	2.635	95% Bootstrap-t UCL	175
Anderson-Darling 5% Critical Value	0.769	95% Hall's Bootstrap UCL	313.9
Kolmogorov-Smirnov Test Statistic	0.278	95% Percentile Bootstrap UCL	150.5
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	159.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	199
		97.5% Chebyshev(Mean, Sd) UCL	235.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	306
95% Approximate Gamma UCL	149.6		
95% Adjusted Gamma UCL	151.3		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 199

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 16

Raw Statistics

Minimum	0.1	Log-transformed Statistics	
Maximum	5	Minimum of Log Data	-2.303
Mean	2.47	Maximum of Log Data	1.609
Median	2.47	Mean of log Data	0.202
SD	2.046	SD of log Data	1.485
Coefficient of Variation	0.828		
Skewness	0.195		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.801
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.037	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.738
95% Adjusted-CLT UCL (Chen-1995)	3.034	95% Chebyshev (MVUE) UCL	8.241
95% Modified-t UCL (Johnson-1978)	3.039	97.5% Chebyshev (MVUE) UCL	10.3
		99% Chebyshev (MVUE) UCL	14.35

Gamma Distribution Test

k star (bias corrected)	0.79	Data Distribution	
Theta Star	3.127	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.47		
MLE of Standard Deviation	2.779		
nu star	58.45	Nonparametric Statistics	
Approximate Chi Square Value (.05)	41.87	95% CLT UCL	3.023
Adjusted Level of Significance	0.0431	95% Jackknife UCL	3.037
Adjusted Chi Square Value	41.26	95% Standard Bootstrap UCL	3.014
Anderson-Darling Test Statistic	2.236	95% Bootstrap-t UCL	3.059
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL	3.022
Kolmogorov-Smirnov Test Statistic	0.199	95% Percentile Bootstrap UCL	3.026
Kolmogorov-Smirnov 5% Critical Value	0.15	95% BCA Bootstrap UCL	2.999
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.936
		97.5% Chebyshev(Mean, Sd) UCL	4.57
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.816
95% Approximate Gamma UCL	3.447		
95% Adjusted Gamma UCL	3.498		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 3.936

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 10

Raw Statistics

Minimum -0.534
 Maximum 152
 Mean 24.9
 Median 24.9
 SD 23.58
 Coefficient of Variation 0.947
 Skewness 4.451

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.447

Shapiro Wilk Critical Value 0.936

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 31.44

Assuming Normal Distribution

95% Student's-t UCL 31.44

Assuming Lognormal Distribution

95% H-UCL N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995) 34.3

95% Modified-t UCL (Johnson-1978) 31.91

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 41.79

95% CLT UCL 31.27

95% Jackknife UCL 31.44

95% Standard Bootstrap UCL 31.31

95% Bootstrap-t UCL 36.81

95% Hall's Bootstrap UCL 60.88

95% Percentile Bootstrap UCL 31.94

95% BCA Bootstrap UCL 35.15

95% Chebyshev(Mean, Sd) UCL 41.79

97.5% Chebyshev(Mean, Sd) UCL 49.11

99% Chebyshev(Mean, Sd) UCL 63.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.16	Minimum of Log Data	-1.833
Maximum	20	Maximum of Log Data	2.996
Mean	12.83	Mean of log Data	2.391
Median	12.83	SD of log Data	0.901
SD	3.505		
Coefficient of Variation	0.273		
Skewness	-2.142		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.553	Shapiro Wilk Test Statistic	0.336
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.81	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	23.07
95% Adjusted-CLT UCL (Chen-1995)	13.56	95% Chebyshev (MVUE) UCL	27.98
95% Modified-t UCL (Johnson-1978)	13.77	97.5% Chebyshev (MVUE) UCL	33.1
		99% Chebyshev (MVUE) UCL	43.15

Gamma Distribution Test

k star (bias corrected)	3.011	Data Distribution	
Theta Star	4.262	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	12.83		
MLE of Standard Deviation	7.396		
nu star	222.8		
Approximate Chi Square Value (.05)	189.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	13.78
Adjusted Chi Square Value	187.9	95% Jackknife UCL	13.81
		95% Standard Bootstrap UCL	13.76
Anderson-Darling Test Statistic	10.2	95% Bootstrap-t UCL	13.65
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	13.64
Kolmogorov-Smirnov Test Statistic	0.52	95% Percentile Bootstrap UCL	13.72
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	13.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.35
		97.5% Chebyshev(Mean, Sd) UCL	16.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.57
95% Approximate Gamma UCL	15.11		
95% Adjusted Gamma UCL	15.22		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 15.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0083	Minimum of Log Data	-4.791
Maximum	0.5	Maximum of Log Data	-0.693
Mean	0.342	Mean of log Data	-1.21
Median	0.342	SD of log Data	0.788
SD	0.092		
Coefficient of Variation	0.269		
Skewness	-2.226		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.543	Shapiro Wilk Test Statistic	0.344
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.367	95% H-UCL	0.54
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.654
95% Adjusted-CLT UCL (Chen-1995)	0.361	97.5% Chebyshev (MVUE) UCL	0.763
95% Modified-t UCL (Johnson-1978)	0.366	99% Chebyshev (MVUE) UCL	0.977

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.537	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0966		
MLE of Mean	0.342		
MLE of Standard Deviation	0.182		
nu star	261.7		
Approximate Chi Square Value (.05)	225.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	0.367
Adjusted Chi Square Value	223.8	95% Jackknife UCL	0.367
		95% Standard Bootstrap UCL	0.367
Anderson-Darling Test Statistic	9.985	95% Bootstrap-t UCL	0.363
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	0.362
Kolmogorov-Smirnov Test Statistic	0.505	95% Percentile Bootstrap UCL	0.364
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	0.362
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.408
		97.5% Chebyshev(Mean, Sd) UCL	0.436
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.492
95% Approximate Gamma UCL	0.397		
95% Adjusted Gamma UCL	0.4		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.408

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	1.34	Minimum of Log Data	0.293
Maximum	438	Maximum of Log Data	6.082
Mean	49.06	Mean of log Data	3.397
Median	49.06	SD of log Data	1.014
SD	73.3		
Coefficient of Variation	1.494		
Skewness	4.59		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	69.41	95% H-UCL	74.97
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	90.35
95% Adjusted-CLT UCL (Chen-1995)	78.6	97.5% Chebyshev (MVUE) UCL	108.3
95% Modified-t UCL (Johnson-1978)	70.92	99% Chebyshev (MVUE) UCL	143.5

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.07	Data do not follow a Discernable Distribution (0.05)	
Theta Star	45.85		
MLE of Mean	49.06		
MLE of Standard Deviation	47.43		
nu star	79.19		
Approximate Chi Square Value (.05)	59.69	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	68.88
Adjusted Chi Square Value	58.95	95% Jackknife UCL	69.41
		95% Standard Bootstrap UCL	68.7
Anderson-Darling Test Statistic	2.825	95% Bootstrap-t UCL	114
Anderson-Darling 5% Critical Value	0.774	95% Hall's Bootstrap UCL	170.6
Kolmogorov-Smirnov Test Statistic	0.322	95% Percentile Bootstrap UCL	70.09
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	86.77
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	101.6
		97.5% Chebyshev(Mean, Sd) UCL	124.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	169
95% Approximate Gamma UCL	65.09		
95% Adjusted Gamma UCL	65.91		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 101.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics		Log-transformed Statistics	
Minimum	0.276	Minimum of Log Data	-1.287
Maximum	48.1	Maximum of Log Data	3.873
Mean	8.854	Mean of log Data	1.904
Median	8.854	SD of log Data	0.926
SD	7.169		
Coefficient of Variation	0.81		
Skewness	4.623		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.378	Shapiro Wilk Test Statistic	0.543
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.84	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.71
95% Adjusted-CLT UCL (Chen-1995)	11.75	95% Chebyshev (MVUE) UCL	17.83
95% Modified-t UCL (Johnson-1978)	10.99	97.5% Chebyshev (MVUE) UCL	21.15
		99% Chebyshev (MVUE) UCL	27.69

Gamma Distribution Test

k star (bias corrected)	1.818	Data Distribution	
Theta Star	4.871	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.854		
MLE of Standard Deviation	6.567		
nu star	134.5		
Approximate Chi Square Value (.05)	108.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	10.79
Adjusted Chi Square Value	107.7	95% Jackknife UCL	10.84
		95% Standard Bootstrap UCL	10.74
Anderson-Darling Test Statistic	8.651	95% Bootstrap-t UCL	12.55
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	19.33
Kolmogorov-Smirnov Test Statistic	0.46	95% Percentile Bootstrap UCL	10.79
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	11.91
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.99
		97.5% Chebyshev(Mean, Sd) UCL	16.21
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.58
95% Approximate Gamma UCL	10.95		
95% Adjusted Gamma UCL	11.06		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 13.99

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics		Log-transformed Statistics	
Minimum	0.0187	Minimum of Log Data	-3.979
Maximum	4.7	Maximum of Log Data	1.548
Mean	0.842	Mean of log Data	-0.494
Median	0.842	SD of log Data	1.043
SD	0.705		
Coefficient of Variation	0.836		
Skewness	4.626		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.377	Shapiro Wilk Test Statistic	0.533
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.038	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.607
95% Adjusted-CLT UCL (Chen-1995)	1.127	95% Chebyshev (MVUE) UCL	1.931
95% Modified-t UCL (Johnson-1978)	1.053	97.5% Chebyshev (MVUE) UCL	2.321
		99% Chebyshev (MVUE) UCL	3.088

Gamma Distribution Test

k star (bias corrected)	1.579	Data Distribution	
Theta Star	0.533	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.842		
MLE of Standard Deviation	0.67		
nu star	116.9		
Approximate Chi Square Value (.05)	92.91	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	1.033
Adjusted Chi Square Value	91.98	95% Jackknife UCL	1.038
		95% Standard Bootstrap UCL	1.031
Anderson-Darling Test Statistic	8.777	95% Bootstrap-t UCL	1.178
Anderson-Darling 5% Critical Value	0.764	95% Hall's Bootstrap UCL	1.891
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	1.071
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	1.155
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.347
		97.5% Chebyshev(Mean, Sd) UCL	1.566
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.995
95% Approximate Gamma UCL	1.06		
95% Adjusted Gamma UCL	1.07		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.347

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics

Minimum	0.359	Log-transformed Statistics	
Maximum	146	Minimum of Log Data	-1.024
Mean	26.11	Maximum of Log Data	4.984
Median	26.11	Mean of log Data	2.914
SD	21.9	SD of log Data	1.125
Coefficient of Variation	0.839		
Skewness	4.62		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.377	Shapiro Wilk Test Statistic	0.526
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	32.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	55.77
95% Adjusted-CLT UCL (Chen-1995)	34.95	95% Chebyshev (MVUE) UCL	66.26
95% Modified-t UCL (Johnson-1978)	32.64	97.5% Chebyshev (MVUE) UCL	80.32
		99% Chebyshev (MVUE) UCL	107.9

Gamma Distribution Test

k star (bias corrected)	1.471	Data Distribution	
Theta Star	17.76	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	26.11		
MLE of Standard Deviation	21.53		
nu star	108.8		
Approximate Chi Square Value (.05)	85.74	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	32.03
Adjusted Chi Square Value	84.85	95% Jackknife UCL	32.19
		95% Standard Bootstrap UCL	32.08
Anderson-Darling Test Statistic	8.84	95% Bootstrap-t UCL	36.54
Anderson-Darling 5% Critical Value	0.765	95% Hall's Bootstrap UCL	58.13
Kolmogorov-Smirnov Test Statistic	0.47	95% Percentile Bootstrap UCL	32.59
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	36.33
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	41.8
		97.5% Chebyshev(Mean, Sd) UCL	48.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	61.94
95% Approximate Gamma UCL	33.14		
95% Adjusted Gamma UCL	33.48		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 41.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	227-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	31	Number of Distinct Observations	13
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Raw Statistics

		Log-transformed Statistics	
Minimum	4.47	Minimum of Log Data	1.5
Maximum	11	Maximum of Log Data	2.4
Mean	7.793	Mean of log Data	2.03
Median	7.793	SD of log Data	0.25
SD	1.806		
Coefficient of Variation	0.232		
Skewness	-0.0701		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.837	Shapiro Wilk Test Statistic	0.81
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.344	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.47
95% Adjusted-CLT UCL (Chen-1995)	8.323	95% Chebyshev (MVUE) UCL	9.36
95% Modified-t UCL (Johnson-1978)	8.343	97.5% Chebyshev (MVUE) UCL	10
		99% Chebyshev (MVUE) UCL	11.3

Gamma Distribution Test

k star (bias corrected)	15.97	Data Distribution	
Theta Star	0.488	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.793		
MLE of Standard Deviation	1.95		
nu star	990.2		
Approximate Chi Square Value (.05)	918.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	8.33
Adjusted Chi Square Value	914.4	95% Jackknife UCL	8.34
		95% Standard Bootstrap UCL	8.33
Anderson-Darling Test Statistic	2.664	95% Bootstrap-t UCL	8.33
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	8.34
Kolmogorov-Smirnov Test Statistic	0.306	95% Percentile Bootstrap UCL	8.3
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	8.34
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.21
		97.5% Chebyshev(Mean, Sd) UCL	9.82
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11
95% Approximate Gamma UCL	8.405		
95% Adjusted Gamma UCL	8.44		

Potential UCL to Use

Use 95% Student's-t UCL	8.34
or 95% Modified-t UCL	8.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	31	Number of Distinct Observations	8
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Raw Statistics

Minimum	66.8	Log-transformed Statistics	
Maximum	275	Minimum of Log Data	4.2
Mean	124.2	Maximum of Log Data	5.62
Median	124.2	Mean of log Data	4.79
SD	35.81	SD of log Data	0.25
Coefficient of Variation	0.288		
Skewness	2.567		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.58	Shapiro Wilk Test Statistic	0.67
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	135.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	135
95% Adjusted-CLT UCL (Chen-1995)	138	95% Chebyshev (MVUE) UCL	149
95% Modified-t UCL (Johnson-1978)	135.6	97.5% Chebyshev (MVUE) UCL	160
		99% Chebyshev (MVUE) UCL	181

Gamma Distribution Test

k star (bias corrected)	14.04	Data Distribution	
Theta Star	8.849	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	124.2		
MLE of Standard Deviation	33.16		
nu star	870.4		
Approximate Chi Square Value (.05)	802.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	135
Adjusted Chi Square Value	799.3	95% Jackknife UCL	135
		95% Standard Bootstrap UCL	135
Anderson-Darling Test Statistic	5.46	95% Bootstrap-t UCL	141
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	202
Kolmogorov-Smirnov Test Statistic	0.402	95% Percentile Bootstrap UCL	135
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	139
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	152
		97.5% Chebyshev(Mean, Sd) UCL	164
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	188
95% Approximate Gamma UCL	134.7		
95% Adjusted Gamma UCL	135.3		

Potential UCL to Use

Use 95% Student's-t UCL	135
or 95% Modified-t UCL	136

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.24	Minimum of Log Data	-1.4
Maximum	0.9	Maximum of Log Data	-0.1
Mean	0.535	Mean of log Data	-0.6
Median	0.535	SD of log Data	0.19
SD	0.0936		
Coefficient of Variation	0.175		
Skewness	1.155		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.564	Shapiro Wilk Test Statistic	0.55
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.563	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.57
95% Adjusted-CLT UCL (Chen-1995)	0.566	95% Chebyshev (MVUE) UCL	0.61
95% Modified-t UCL (Johnson-1978)	0.564	97.5% Chebyshev (MVUE) UCL	0.65
		99% Chebyshev (MVUE) UCL	0.72

Gamma Distribution Test

k star (bias corrected)	29.29	Data Distribution	
Theta Star	0.0183	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.535		
MLE of Standard Deviation	0.0988		
nu star	1816		
Approximate Chi Square Value (.05)	1718	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.56
Adjusted Chi Square Value	1713	95% Jackknife UCL	0.56
		95% Standard Bootstrap UCL	0.56
Anderson-Darling Test Statistic	6.388	95% Bootstrap-t UCL	0.57
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.61
Kolmogorov-Smirnov Test Statistic	0.412	95% Percentile Bootstrap UCL	0.56
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	0.57
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.61
		97.5% Chebyshev(Mean, Sd) UCL	0.64
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.7
95% Approximate Gamma UCL	0.565		
95% Adjusted Gamma UCL	0.567		

Potential UCL to Use

Use 95% Student's-t UCL 0.56
or 95% Modified-t UCL 0.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	31	Number of Distinct Observations	16
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Raw Statistics

Minimum	9.4	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.24
Mean	34.28	Maximum of Log Data	4.44
Median	34.28	Mean of log Data	3.43
SD	14.28	SD of log Data	0.5
Coefficient of Variation	0.417		
Skewness	1.034		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.772	Shapiro Wilk Test Statistic	0.73
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	38.63	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	41.9
95% Adjusted-CLT UCL (Chen-1995)	39.01	95% Chebyshev (MVUE) UCL	49.4
95% Modified-t UCL (Johnson-1978)	38.71	97.5% Chebyshev (MVUE) UCL	55.6
		99% Chebyshev (MVUE) UCL	67.8

Gamma Distribution Test

k star (bias corrected)	4.615	Data Distribution	
Theta Star	7.429	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	34.28		
MLE of Standard Deviation	15.96		
nu star	286.1		
Approximate Chi Square Value (.05)	247.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	38.5
Adjusted Chi Square Value	246	95% Jackknife UCL	38.6
		95% Standard Bootstrap UCL	38.5
Anderson-Darling Test Statistic	3.825	95% Bootstrap-t UCL	39
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	40.7
Kolmogorov-Smirnov Test Statistic	0.358	95% Percentile Bootstrap UCL	38.6
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	45.5
		97.5% Chebyshev(Mean, Sd) UCL	50.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	59.8
95% Approximate Gamma UCL	39.56		
95% Adjusted Gamma UCL	39.87		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	45.5
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	2.97	Minimum of Log Data	1.09
Maximum	24.4	Maximum of Log Data	3.2
Mean	9.569	Mean of log Data	2.2
Median	9.569	SD of log Data	0.35
SD	3.408		
Coefficient of Variation	0.356		
Skewness	2.561		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.563	Shapiro Wilk Test Statistic	0.64
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.61	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.8
95% Adjusted-CLT UCL (Chen-1995)	10.88	95% Chebyshev (MVUE) UCL	12.3
95% Modified-t UCL (Johnson-1978)	10.65	97.5% Chebyshev (MVUE) UCL	13.4
		99% Chebyshev (MVUE) UCL	15.7

Gamma Distribution Test

k star (bias corrected)	8.422	Data Distribution	
Theta Star	1.136	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.569		
MLE of Standard Deviation	3.297		
nu star	522.2		
Approximate Chi Square Value (.05)	470.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	10.6
Adjusted Chi Square Value	467.5	95% Jackknife UCL	10.6
		95% Standard Bootstrap UCL	10.5
Anderson-Darling Test Statistic	5.877	95% Bootstrap-t UCL	11
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	16.8
Kolmogorov-Smirnov Test Statistic	0.392	95% Percentile Bootstrap UCL	10.7
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	10.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.2
		97.5% Chebyshev(Mean, Sd) UCL	13.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.7
95% Approximate Gamma UCL	10.63		
95% Adjusted Gamma UCL	10.69		

Potential UCL to Use

Use 95% Student's-t UCL 10.6
or 95% Modified-t UCL 10.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics
Minimum	-0.00684	Log Statistics Not Available
Maximum	0.0347	
Mean	0.00885	
Median	0.00885	
SD	0.00617	
Coefficient of Variation	0.697	
Skewness	1.596	

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.463	Not Available
Shapiro Wilk Critical Value	0.929	
Data not Normal at 5% Significance Level		

Assuming Normal Distribution

95% Student's-t UCL	0.0107	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.0107	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.01
		95% Modified-t UCL (Johnson-1978)	0.01

Gamma Distribution Test

Gamma Statistics Not Available	Data Distribution
	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0137	95% CLT UCL	0.01
		95% Jackknife UCL	0.01
		95% Standard Bootstrap UCL	0.01
		95% Bootstrap-t UCL	0.01
		95% Hall's Bootstrap UCL	0.01
		95% Percentile Bootstrap UCL	0.01
		95% BCA Bootstrap UCL	0.01
		95% Chebyshev(Mean, Sd) UCL	0.01
		97.5% Chebyshev(Mean, Sd) UCL	0.02
		99% Chebyshev(Mean, Sd) UCL	0.02

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	193	Minimum of Log Data	5.26
Maximum	2390	Maximum of Log Data	7.78
Mean	619.6	Mean of log Data	6.31
Median	619.6	SD of log Data	0.48
SD	387.4		
Coefficient of Variation	0.625		
Skewness	3.383		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.86
Shapiro Wilk Test Statistic	0.616	Shapiro Wilk Critical Value	0.93
Shapiro Wilk Critical Value	0.929	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	737.7	95% H-UCL	725
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	849
95% Adjusted-CLT UCL (Chen-1995)	779.2	97.5% Chebyshev (MVUE) UCL	952
95% Modified-t UCL (Johnson-1978)	744.8	99% Chebyshev (MVUE) UCL	1153

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.874	Data do not follow a Discernable Distribution (0.05)	
Theta Star	159.9		
MLE of Mean	619.6		
MLE of Standard Deviation	314.8		
nu star	240.2		
Approximate Chi Square Value (.05)	205.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	734
Adjusted Chi Square Value	203.5	95% Jackknife UCL	738
		95% Standard Bootstrap UCL	731
Anderson-Darling Test Statistic	2.475	95% Bootstrap-t UCL	839
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	1273
Kolmogorov-Smirnov Test Statistic	0.287	95% Percentile Bootstrap UCL	735
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	795
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	923
		97.5% Chebyshev(Mean, Sd) UCL	1054
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1312
95% Approximate Gamma UCL	724.9		
95% Adjusted Gamma UCL	731.2		

Potential UCL to Use

Use 95% Student's-t UCL 738
or 95% Modified-t UCL 745

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0266	Minimum of Log Data	-3.6
Maximum		10 Maximum of Log Data	2.3
Mean	5.737	Mean of log Data	1.06
Median	5.737	SD of log Data	1.83
SD	3.303		
Coefficient of Variation	0.576		
Skewness	-0.509		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.806	Shapiro Wilk Test Statistic	0.61
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.744	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	50.6
95% Adjusted-CLT UCL (Chen-1995)	6.655	95% Chebyshev (MVUE) UCL	39.4
95% Modified-t UCL (Johnson-1978)	6.735	97.5% Chebyshev (MVUE) UCL	50.6
		99% Chebyshev (MVUE) UCL	72.5

Gamma Distribution Test

k star (bias corrected)	0.795	Data Distribution	
Theta Star	7.213	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.737		
MLE of Standard Deviation	6.433		
nu star	49.32		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0413	Nonparametric Statistics	
Adjusted Chi Square Value	33.49	95% CLT UCL	6.71
		95% Jackknife UCL	6.74
		95% Standard Bootstrap UCL	6.69

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	5.244	95% Bootstrap-t UCL	6.71
Anderson-Darling 5% Critical Value	0.783	95% Hall's Bootstrap UCL	6.67
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	6.7
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	6.65
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.32
		97.5% Chebyshev(Mean, Sd) UCL	9.44
		99% Chebyshev(Mean, Sd) UCL	11.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.274
95% Adjusted Gamma UCL	8.447

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 8.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 6

Raw Statistics

Minimum	-0.0044	Log Statistics Not Available
Maximum	0.085	
Mean	0.0278	
Median	0.0278	
SD	0.0134	
Coefficient of Variation	0.48	
Skewness	2.106	

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.526 Not Available
Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0319	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.0319	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.03
		95% Modified-t UCL (Johnson-1978)	0.03

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0383	95% CLT UCL	0.03
		95% Jackknife UCL	0.03
		95% Standard Bootstrap UCL	0.03
		95% Bootstrap-t UCL	0.03
		95% Hall's Bootstrap UCL	0.06
		95% Percentile Bootstrap UCL	0.03
		95% BCA Bootstrap UCL	0.03
		95% Chebyshev(Mean, Sd) UCL	0.04
		97.5% Chebyshev(Mean, Sd) UCL	0.04
		99% Chebyshev(Mean, Sd) UCL	0.05

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	4.52	Minimum of Log Data	1.51
Maximum	192.4	Maximum of Log Data	5.26
Mean	89.95	Mean of log Data	4.27
Median	89.95	SD of log Data	0.91
SD	42.38		
Coefficient of Variation	0.471		
Skewness	0.0721		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic	0.62
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	102.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	157
95% Adjusted-CLT UCL (Chen-1995)	102.6	95% Chebyshev (MVUE) UCL	190
95% Modified-t UCL (Johnson-1978)	102.9	97.5% Chebyshev (MVUE) UCL	226
		99% Chebyshev (MVUE) UCL	298

Gamma Distribution Test

k star (bias corrected)	2.099	Data Distribution	
Theta Star	42.85	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	89.95		
MLE of Standard Deviation	62.09		
nu star	130.1		
Approximate Chi Square Value (.05)	104.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	103
Adjusted Chi Square Value	103.5	95% Jackknife UCL	103
		95% Standard Bootstrap UCL	103
Anderson-Darling Test Statistic	4.673	95% Bootstrap-t UCL	103
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	104
Kolmogorov-Smirnov Test Statistic	0.393	95% Percentile Bootstrap UCL	102
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	102
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	123
		97.5% Chebyshev(Mean, Sd) UCL	138
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	166
95% Approximate Gamma UCL	111.7		
95% Adjusted Gamma UCL	113.1		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 123

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 20

Raw Statistics

		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.1
Maximum	12.6	Maximum of Log Data	2.53
Mean	3.406	Mean of log Data	0.67
Median	3.406	SD of log Data	1.31
SD	2.922		
Coefficient of Variation	0.858		
Skewness	1.244		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.871	Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	4.297	95% H-UCL	9.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.92
95% Adjusted-CLT UCL (Chen-1995)	4.395	97.5% Chebyshev (MVUE) UCL	12.3
95% Modified-t UCL (Johnson-1978)	4.317	99% Chebyshev (MVUE) UCL	17

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.951	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	3.581		
MLE of Mean	3.406		
MLE of Standard Deviation	3.493		
nu star	58.98		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0413	Nonparametric Statistics	
Adjusted Chi Square Value	41.54	95% CLT UCL	4.27
		95% Jackknife UCL	4.3
		95% Standard Bootstrap UCL	4.27

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.906	95% Bootstrap-t UCL	4.43
Anderson-Darling 5% Critical Value	0.775	95% Hall's Bootstrap UCL	4.59
Kolmogorov-Smirnov Test Statistic	0.157	95% Percentile Bootstrap UCL	4.29
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	4.4
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.69
		97.5% Chebyshev(Mean, Sd) UCL	6.68
		99% Chebyshev(Mean, Sd) UCL	8.63

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.747
95% Adjusted Gamma UCL	4.837

Potential UCL to Use

Use 95% Approximate Gamma UCL	4.75
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	0.031	Minimum of Log Data	-3.5
Maximum	10.07	Maximum of Log Data	2.31
Mean	6.235	Mean of log Data	1.53
Median	6.235	SD of log Data	1.2
SD	2.919		
Coefficient of Variation	0.468		
Skewness	-0.405		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.57
Shapiro Wilk Test Statistic	0.845	Shapiro Wilk Critical Value	0.93
Shapiro Wilk Critical Value	0.929	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	7.125	95% H-UCL	16.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	19.3
95% Adjusted-CLT UCL (Chen-1995)	7.056	97.5% Chebyshev (MVUE) UCL	23.8
95% Modified-t UCL (Johnson-1978)	7.118	99% Chebyshev (MVUE) UCL	32.5

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.648	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.784		
MLE of Mean	6.235		
MLE of Standard Deviation	4.857		
nu star	102.2		

Approximate Chi Square Value (.05)

		Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	7.1
Adjusted Chi Square Value	78.75	95% Jackknife UCL	7.13

Anderson-Darling Test Statistic

		95% Standard Bootstrap UCL	7.1
Anderson-Darling Test Statistic	3.489	95% Bootstrap-t UCL	7.08
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	7.05
Kolmogorov-Smirnov Test Statistic	0.373	95% Percentile Bootstrap UCL	7.05
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	7.07
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.52
		97.5% Chebyshev(Mean, Sd) UCL	9.51
		99% Chebyshev(Mean, Sd) UCL	11.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.978
95% Adjusted Gamma UCL	8.089

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 8.52

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0656	Minimum of Log Data	-2.7
Maximum	0.49	Maximum of Log Data	-0.7
Mean	0.34	Mean of log Data	-1.1
Median	0.34	SD of log Data	0.37
SD	0.08		
Coefficient of Variation	0.235		
Skewness	-1.589		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.584	Shapiro Wilk Test Statistic	0.46
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.365	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.39
95% Adjusted-CLT UCL (Chen-1995)	0.359	95% Chebyshev (MVUE) UCL	0.45
95% Modified-t UCL (Johnson-1978)	0.364	97.5% Chebyshev (MVUE) UCL	0.5
		99% Chebyshev (MVUE) UCL	0.59

Gamma Distribution Test

k star (bias corrected)	9.599	Data Distribution	
Theta Star	0.0354	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.34		
MLE of Standard Deviation	0.11		
nu star	595.2		
Approximate Chi Square Value (.05)	539.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.36
Adjusted Chi Square Value	536.6	95% Jackknife UCL	0.37
		95% Standard Bootstrap UCL	0.36
Anderson-Darling Test Statistic	7.084	95% Bootstrap-t UCL	0.36
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.36
Kolmogorov-Smirnov Test Statistic	0.476	95% Percentile Bootstrap UCL	0.36
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	0.36
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.4
		97.5% Chebyshev(Mean, Sd) UCL	0.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.48
95% Approximate Gamma UCL	0.375		
95% Adjusted Gamma UCL	0.377		

Potential UCL to Use

Use 95% Student's-t UCL 0.37
or 95% Modified-t UCL 0.36

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

Minimum	1.11	Log-transformed Statistics	
Maximum	200	Minimum of Log Data	0.1
Mean	23.29	Maximum of Log Data	5.3
Median	23.29	Mean of log Data	2.75
SD	33.64	SD of log Data	0.91
Coefficient of Variation	1.445		
Skewness	5.12		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.358	Shapiro Wilk Test Statistic	0.77
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	33.54	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	34.6
95% Adjusted-CLT UCL (Chen-1995)	39.16	95% Chebyshev (MVUE) UCL	41.8
95% Modified-t UCL (Johnson-1978)	34.47	97.5% Chebyshev (MVUE) UCL	49.8
		99% Chebyshev (MVUE) UCL	65.6

Gamma Distribution Test

k star (bias corrected)	1.288	Data Distribution	
Theta Star	18.08	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	23.29		
MLE of Standard Deviation	20.52		
nu star	79.85		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0413	Nonparametric Statistics	
Adjusted Chi Square Value	59.31	95% CLT UCL	33.2
		95% Jackknife UCL	33.5
		95% Standard Bootstrap UCL	32.9

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.272	95% Bootstrap-t UCL	54.5
Anderson-Darling 5% Critical Value	0.766	95% Hall's Bootstrap UCL	75.8
Kolmogorov-Smirnov Test Statistic	0.356	95% Percentile Bootstrap UCL	34.9
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	41.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	49.6
		97.5% Chebyshev(Mean, Sd) UCL	61
		99% Chebyshev(Mean, Sd) UCL	83.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	30.86
95% Adjusted Gamma UCL	31.35

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 49.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 6

Raw Statistics

Minimum	0.373	Log-transformed Statistics	
Maximum	2.45	Minimum of Log Data	-1
Mean	1.473	Maximum of Log Data	0.9
Median	1.473	Mean of log Data	0.35
SD	0.328	SD of log Data	0.31
Coefficient of Variation	0.223		
Skewness	-0.715		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.573	Shapiro Wilk Test Statistic	0.48
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.573	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.65
95% Adjusted-CLT UCL (Chen-1995)	1.562	95% Chebyshev (MVUE) UCL	1.86
95% Modified-t UCL (Johnson-1978)	1.572	97.5% Chebyshev (MVUE) UCL	2.01
		99% Chebyshev (MVUE) UCL	2.33

Gamma Distribution Test

k star (bias corrected)	12.84	Data Distribution	
Theta Star	0.115	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.473		
MLE of Standard Deviation	0.411		
nu star	796.1		
Approximate Chi Square Value (.05)	731.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	1.57
Adjusted Chi Square Value	728.2	95% Jackknife UCL	1.57
		95% Standard Bootstrap UCL	1.57
Anderson-Darling Test Statistic	7.344	95% Bootstrap-t UCL	1.56
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	1.58
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	1.56
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	1.56
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.73
		97.5% Chebyshev(Mean, Sd) UCL	1.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.06
95% Approximate Gamma UCL	1.603		
95% Adjusted Gamma UCL	1.61		

Potential UCL to Use

Use 95% Student's-t UCL 1.57
or 95% Modified-t UCL 1.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	14.2	Minimum of Log Data	2.65
Maximum	39.2	Maximum of Log Data	3.67
Mean	23.33	Mean of log Data	3.14
Median	23.33	SD of log Data	0.17
SD	4.072		
Coefficient of Variation	0.175		
Skewness	1.562		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.647	Shapiro Wilk Test Statistic	0.68
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	24.57	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	24.6
95% Adjusted-CLT UCL (Chen-1995)	24.75	95% Chebyshev (MVUE) UCL	26.4
95% Modified-t UCL (Johnson-1978)	24.6	97.5% Chebyshev (MVUE) UCL	27.8
		99% Chebyshev (MVUE) UCL	30.4

Gamma Distribution Test

k star (bias corrected)	32.87	Data Distribution	
Theta Star	0.71	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	23.33		
MLE of Standard Deviation	4.069		
nu star	2038		
Approximate Chi Square Value (.05)	1934	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	24.5
Adjusted Chi Square Value	1929	95% Jackknife UCL	24.6
		95% Standard Bootstrap UCL	24.5
Anderson-Darling Test Statistic	5.36	95% Bootstrap-t UCL	24.8
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	25.9
Kolmogorov-Smirnov Test Statistic	0.393	95% Percentile Bootstrap UCL	24.6
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	24.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	26.5
		97.5% Chebyshev(Mean, Sd) UCL	27.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	30.6
95% Approximate Gamma UCL	24.58		
95% Adjusted Gamma UCL	24.65		

Potential UCL to Use

Use 95% Student's-t UCL 24.6
or 95% Modified-t UCL 24.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

227-01.wst
 OFF
 95%
 2000

Beryllium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics

Minimum 0.454
 Maximum 0.79
 Mean 0.539
 Median 0.539
 SD 0.0472
 Coefficient of Variation 0.0876
 Skewness 4.092

Log-transformed Statistics

Minimum of Log Data -0.79
 Maximum of Log Data -0.236
 Mean of log Data -0.621
 SD of log Data 0.077

Relevant UCL Statistics

Normal Distribution Test Lognormal Distribution Test
 Shapiro Wilk Test Statistic 0.395 Shapiro Wilk Test Statistic 0.441
 Shapiro Wilk Critical Value 0.936 Shapiro Wilk Critical Value 0.936
 Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.552
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 0.557
 95% Modified-t UCL (Johnson-1978) 0.553

Assuming Lognormal Distribution

95% H-UCL N/A
 95% Chebyshev (MVUE) UCL 0.568
 97.5% Chebyshev (MVUE) UCL 0.581
 99% Chebyshev (MVUE) UCL 0.607

Gamma Distribution Test

k star (bias corrected) 147
 Theta Star 0.00366
 MLE of Mean 0.539
 MLE of Standard Deviation 0.0444
 nu star 10882

Data Distribution

147 Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.0431
 Adjusted Chi Square Value 10630

Nonparametric Statistics

95% CLT UCL 0.552
 95% Jackknife UCL 0.552
 95% Standard Bootstrap UCL 0.551
 95% Bootstrap-t UCL 0.559
 95% Hall's Bootstrap UCL 0.612
 95% Percentile Bootstrap UCL 0.554
 95% BCA Bootstrap UCL 0.558
 95% Chebyshev(Mean, Sd) UCL 0.573
 97.5% Chebyshev(Mean, Sd) UCL 0.587
 99% Chebyshev(Mean, Sd) UCL 0.616

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 0.746
 Kolmogorov-Smirnov Test Statistic 0.452
 Kolmogorov-Smirnov 5% Critical Value 0.144

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 0.551
 95% Adjusted Gamma UCL 0.552

Potential UCL to Use

Use 95% Student's-t UCL 0.552
 or 95% Modified-t UCL 0.553

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 6

Raw Statistics

Minimum -0.038
 Maximum 0.51
 Mean 0.138
 Median 0.138
 SD 0.072
 Coefficient of Variation 0.52
 Skewness 3.462

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.397
 Shapiro Wilk Critical Value 0.936

Lognormal Distribution Test

Not Available

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.158

Assuming Normal Distribution

95% Student's-t UCL 0.158

Assuming Lognormal Distribution

95% H-UCL N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995) 0.165

95% Modified-t UCL (Johnson-1978) 0.16

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.19

95% CLT UCL 0.158
 95% Jackknife UCL 0.158
 95% Standard Bootstrap UCL 0.158
 95% Bootstrap-t UCL 0.165
 95% Hall's Bootstrap UCL 0.262
 95% Percentile Bootstrap UCL 0.159
 95% BCA Bootstrap UCL 0.169
 95% Chebyshev(Mean, Sd) UCL 0.19
 97.5% Chebyshev(Mean, Sd) UCL 0.212
 99% Chebyshev(Mean, Sd) UCL 0.256

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	7.38	Minimum of Log Data	1.999
Maximum	85	Maximum of Log Data	4.443
Mean	45.45	Mean of log Data	3.678
Median	45.45	SD of log Data	0.595
SD	21.21		
Coefficient of Variation	0.467		
Skewness	0.473		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.787
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	51.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	57.55
95% Adjusted-CLT UCL (Chen-1995)	51.47	95% Chebyshev (MVUE) UCL	68.33
95% Modified-t UCL (Johnson-1978)	51.38	97.5% Chebyshev (MVUE) UCL	77.57
		99% Chebyshev (MVUE) UCL	95.71

Gamma Distribution Test

k star (bias corrected)	3.486	Data Distribution	
Theta Star	13.04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	45.45		
MLE of Standard Deviation	24.34		
nu star	257.9		
Approximate Chi Square Value (.05)	221.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	51.18
Adjusted Chi Square Value	220.3	95% Jackknife UCL	51.33
		95% Standard Bootstrap UCL	51.03
Anderson-Darling Test Statistic	3.14	95% Bootstrap-t UCL	51.86
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	51.84
Kolmogorov-Smirnov Test Statistic	0.244	95% Percentile Bootstrap UCL	51.25
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	51.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	60.65
		97.5% Chebyshev(Mean, Sd) UCL	67.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	80.14
95% Approximate Gamma UCL	52.86		
95% Adjusted Gamma UCL	53.21		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 60.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics
Minimum	-0.0318 Log Statistics Not Available
Maximum	0.0153
Mean	-0.00478
Median	-0.00478
SD	0.00573
Coefficient of Variation	-1.198
Skewness	-1.763

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.372 Not Available
Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	-0.00319	95% H-UCL N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)
95% Student's-t UCL	-0.00319	95% Adjusted-CLT UCL (Chen 1995) -0.00353
		95% Modified-t UCL (Johnson-1978) -0.00324

Gamma Distribution Test Data Distribution
 Gamma Statistics Not Available Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use		
Use 95% Chebyshev (Mean, Sd) UCL	-6.78E-04	95% CLT UCL -0.00323
		95% Jackknife UCL -0.00319
		95% Standard Bootstrap UCL -0.00321
		95% Bootstrap-t UCL -0.00343
		95% Hall's Bootstrap UCL -0.00331
		95% Percentile Bootstrap UCL -0.00332
		95% BCA Bootstrap UCL -0.0037
		95% Chebyshev(Mean, Sd) UCL -6.78E-04
		97.5% Chebyshev(Mean, Sd) UCL 0.0011
		99% Chebyshev(Mean, Sd) UCL 0.00459

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	4.83E-04 Minimum of Log Data	-7.635
Maximum	2.53 Maximum of Log Data	0.928
Mean	0.646 Mean of log Data	-0.771
Median	0.646 SD of log Data	1.402
SD	0.363	
Coefficient of Variation	0.562	
Skewness	3.661	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.382 Shapiro Wilk Test Statistic	0.376
Shapiro Wilk Critical Value	0.936 Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.746	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.426
95% Adjusted-CLT UCL (Chen-1995)	0.782	95% Chebyshev (MVUE) UCL	2.674
95% Modified-t UCL (Johnson-1978)	0.752	97.5% Chebyshev (MVUE) UCL	3.322
		99% Chebyshev (MVUE) UCL	4.595

Gamma Distribution Test

k star (bias corrected)	1.532	Data Distribution	
Theta Star	0.421	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.646		
MLE of Standard Deviation	0.521		
nu star	113.4		
Approximate Chi Square Value (.05)	89.82	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	0.744
Adjusted Chi Square Value	88.91	95% Jackknife UCL	0.746
		95% Standard Bootstrap UCL	0.739
Anderson-Darling Test Statistic	10.98	95% Bootstrap-t UCL	0.787
Anderson-Darling 5% Critical Value	0.764	95% Hall's Bootstrap UCL	1.238
Kolmogorov-Smirnov Test Statistic	0.522	95% Percentile Bootstrap UCL	0.747
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	0.798
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.905
		97.5% Chebyshev(Mean, Sd) UCL	1.018
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.239
95% Approximate Gamma UCL	0.815		
95% Adjusted Gamma UCL	0.823		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.905

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	8.64	Minimum of Log Data	2.156
Maximum	653	Maximum of Log Data	6.482
Mean	120.5	Mean of log Data	4.428
Median	120.5	SD of log Data	0.966
SD	115.1		
Coefficient of Variation	0.955		
Skewness	3.207		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.628	Shapiro Wilk Test Statistic	0.809
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	152.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	195
95% Adjusted-CLT UCL (Chen-1995)	162.3	95% Chebyshev (MVUE) UCL	235.9
95% Modified-t UCL (Johnson-1978)	154.1	97.5% Chebyshev (MVUE) UCL	281.2
		99% Chebyshev (MVUE) UCL	370.1

Gamma Distribution Test

k star (bias corrected)	1.414	Data Distribution	
Theta Star	85.22	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	120.5		
MLE of Standard Deviation	101.3		
nu star	104.6		
Approximate Chi Square Value (.05)	82.02	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	151.6
Adjusted Chi Square Value	81.15	95% Jackknife UCL	152.4
		95% Standard Bootstrap UCL	151.3
Anderson-Darling Test Statistic	2.731	95% Bootstrap-t UCL	175.4
Anderson-Darling 5% Critical Value	0.766	95% Hall's Bootstrap UCL	296.6
Kolmogorov-Smirnov Test Statistic	0.284	95% Percentile Bootstrap UCL	155.1
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	167.2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	203
		97.5% Chebyshev(Mean, Sd) UCL	238.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	308.8
95% Approximate Gamma UCL	153.7		
95% Adjusted Gamma UCL	155.3		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 203

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	0.1	Minimum of Log Data	-2.303
Maximum	5	Maximum of Log Data	1.609
Mean	2.703	Mean of log Data	0.375
Median	2.703	SD of log Data	1.434
SD	2.01		
Coefficient of Variation	0.744		
Skewness	-0.0238		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.808	Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.261	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.197
95% Adjusted-CLT UCL (Chen-1995)	3.245	95% Chebyshev (MVUE) UCL	8.921
95% Modified-t UCL (Johnson-1978)	3.26	97.5% Chebyshev (MVUE) UCL	11.11
		99% Chebyshev (MVUE) UCL	15.41

Gamma Distribution Test

k star (bias corrected)	0.881	Data Distribution	
Theta Star	3.066	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.703		
MLE of Standard Deviation	2.879		
nu star	65.23		
Approximate Chi Square Value (.05)	47.65	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	3.246
Adjusted Chi Square Value	46.99	95% Jackknife UCL	3.261
		95% Standard Bootstrap UCL	3.24
Anderson-Darling Test Statistic	2.629	95% Bootstrap-t UCL	3.233
Anderson-Darling 5% Critical Value	0.78	95% Hall's Bootstrap UCL	3.224
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	3.218
Kolmogorov-Smirnov 5% Critical Value	0.15	95% BCA Bootstrap UCL	3.223
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.143
		97.5% Chebyshev(Mean, Sd) UCL	4.766
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.991
95% Approximate Gamma UCL	3.7		
95% Adjusted Gamma UCL	3.751		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 4.143

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 8

Raw Statistics

Minimum -0.534
 Maximum 152
 Mean 31.4
 Median 31.4
 SD 22.78
 Coefficient of Variation 0.726
 Skewness 4.086

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.442
 Shapiro Wilk Critical Value 0.936

Lognormal Distribution Test

Not Available

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 37.72

Assuming Normal Distribution

95% Student's-t UCL 37.72

Assuming Lognormal Distribution

95% H-UCL N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995) 40.25

95% Modified-t UCL (Johnson-1978) 38.14

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 47.72

95% CLT UCL 37.56

95% Jackknife UCL 37.72

95% Standard Bootstrap UCL 37.42

95% Bootstrap-t UCL 41.56

95% Hall's Bootstrap UCL 66.89

95% Percentile Bootstrap UCL 37.73

95% BCA Bootstrap UCL 40.47

95% Chebyshev(Mean, Sd) UCL 47.72

97.5% Chebyshev(Mean, Sd) UCL 54.79

99% Chebyshev(Mean, Sd) UCL 68.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 7

Raw Statistics	Log-transformed Statistics	
Minimum	0.018 Minimum of Log Data	-4.017
Maximum	0.5 Maximum of Log Data	-0.693
Mean	0.378 Mean of log Data	-1.034
Median	0.378 SD of log Data	0.51
SD	0.0691	
Coefficient of Variation	0.183	
Skewness	-3.774	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.438 Shapiro Wilk Test Statistic	0.252
Shapiro Wilk Critical Value	0.936 Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.397	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.477
95% Adjusted-CLT UCL (Chen-1995)	0.389	95% Chebyshev (MVUE) UCL	0.558
95% Modified-t UCL (Johnson-1978)	0.396	97.5% Chebyshev (MVUE) UCL	0.625
		99% Chebyshev (MVUE) UCL	0.757

Gamma Distribution Test

k star (bias corrected)	7.831	Data Distribution	
Theta Star	0.0482	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.378		
MLE of Standard Deviation	0.135		
nu star	579.5		
Approximate Chi Square Value (.05)	524.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	0.396
Adjusted Chi Square Value	522.4	95% Jackknife UCL	0.397
		95% Standard Bootstrap UCL	0.396
Anderson-Darling Test Statistic	10.59	95% Bootstrap-t UCL	0.393
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	0.391
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	0.393
Kolmogorov-Smirnov 5% Critical Value	0.145	95% BCA Bootstrap UCL	0.39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.427
		97.5% Chebyshev(Mean, Sd) UCL	0.449
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.491
95% Approximate Gamma UCL	0.417		
95% Adjusted Gamma UCL	0.419		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.427

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	1.34	Minimum of Log Data	0.293
Maximum	438	Maximum of Log Data	6.082
Mean	49.06	Mean of log Data	3.397
Median	49.06	SD of log Data	1.014
SD	73.3		
Coefficient of Variation	1.494		
Skewness	4.59		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.41	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	74.97
95% Adjusted-CLT UCL (Chen-1995)	78.6	95% Chebyshev (MVUE) UCL	90.35
95% Modified-t UCL (Johnson-1978)	70.92	97.5% Chebyshev (MVUE) UCL	108.3
		99% Chebyshev (MVUE) UCL	143.5

Gamma Distribution Test

k star (bias corrected)	1.07	Data Distribution	
Theta Star	45.85	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	49.06		
MLE of Standard Deviation	47.43		
nu star	79.19		
Approximate Chi Square Value (.05)	59.69	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	68.88
Adjusted Chi Square Value	58.95	95% Jackknife UCL	69.41
		95% Standard Bootstrap UCL	68.5
Anderson-Darling Test Statistic	2.825	95% Bootstrap-t UCL	114.5
Anderson-Darling 5% Critical Value	0.774	95% Hall's Bootstrap UCL	170.9
Kolmogorov-Smirnov Test Statistic	0.322	95% Percentile Bootstrap UCL	71.31
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	81
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	101.6
		97.5% Chebyshev(Mean, Sd) UCL	124.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	169
95% Approximate Gamma UCL	65.09		
95% Adjusted Gamma UCL	65.91		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 101.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.276 Minimum of Log Data	-1.287
Maximum	48.1 Maximum of Log Data	3.873
Mean	10.4 Mean of log Data	2.1
Median	10.4 SD of log Data	0.912
SD	7.028	
Coefficient of Variation	0.676	
Skewness	4.245	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.383 Shapiro Wilk Test Statistic	0.483
Shapiro Wilk Critical Value	0.936 Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.35	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17.54
95% Adjusted-CLT UCL (Chen-1995)	13.16	95% Chebyshev (MVUE) UCL	21.26
95% Modified-t UCL (Johnson-1978)	12.49	97.5% Chebyshev (MVUE) UCL	25.19
		99% Chebyshev (MVUE) UCL	32.9

Gamma Distribution Test

k star (bias corrected)	2.055	Data Distribution	
Theta Star	5.062	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.4		
MLE of Standard Deviation	7.256		
nu star	152.1		
Approximate Chi Square Value (.05)	124.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	12.3
Adjusted Chi Square Value	123.5	95% Jackknife UCL	12.35
		95% Standard Bootstrap UCL	12.25
Anderson-Darling Test Statistic	9.605	95% Bootstrap-t UCL	13.45
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	21.07
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	12.47
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	13.46
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.44
		97.5% Chebyshev(Mean, Sd) UCL	17.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.9
95% Approximate Gamma UCL	12.7		
95% Adjusted Gamma UCL	12.81		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 15.44

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.0187 Minimum of Log Data	-3.979
Maximum	4.7 Maximum of Log Data	1.548
Mean	0.995 Mean of log Data	-0.285
Median	0.995 SD of log Data	1.024
SD	0.691	
Coefficient of Variation	0.694	
Skewness	4.248	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.382 Shapiro Wilk Test Statistic	0.474
Shapiro Wilk Critical Value	0.936 Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.187	95% H-UCL	1.919
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.31
95% Adjusted-CLT UCL (Chen-1995)	1.267	97.5% Chebyshev (MVUE) UCL	2.772
95% Modified-t UCL (Johnson-1978)	1.2	99% Chebyshev (MVUE) UCL	3.678

Gamma Distribution Test

k star (bias corrected)	1.794	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.555		
MLE of Mean	0.995		
MLE of Standard Deviation	0.743		
nu star	132.7		
Approximate Chi Square Value (.05)	107.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	1.182
Adjusted Chi Square Value	106.1	95% Jackknife UCL	1.187
		95% Standard Bootstrap UCL	1.179
Anderson-Darling Test Statistic	9.732	95% Bootstrap-t UCL	1.295
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	2.043
Kolmogorov-Smirnov Test Statistic	0.487	95% Percentile Bootstrap UCL	1.199
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	1.294
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.49
		97.5% Chebyshev(Mean, Sd) UCL	1.704
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.125
95% Approximate Gamma UCL	1.233		
95% Adjusted Gamma UCL	1.245		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 37 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.359 Minimum of Log Data	-1.024
Maximum	146 Maximum of Log Data	4.984
Mean	30.9 Mean of log Data	3.126
Median	30.9 SD of log Data	1.107
SD	21.46	
Coefficient of Variation	0.695	
Skewness	4.242	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.382 Shapiro Wilk Test Statistic	0.465
Shapiro Wilk Critical Value	0.936 Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	36.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	66.83
95% Adjusted-CLT UCL (Chen-1995)	39.33	95% Chebyshev (MVUE) UCL	79.64
95% Modified-t UCL (Johnson-1978)	37.26	97.5% Chebyshev (MVUE) UCL	96.36
		99% Chebyshev (MVUE) UCL	129.2

Gamma Distribution Test

k star (bias corrected)	1.665	Data Distribution	
Theta Star	18.55	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	30.9		
MLE of Standard Deviation	23.94		
nu star	123.2		
Approximate Chi Square Value (.05)	98.59	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	36.7
Adjusted Chi Square Value	97.63	95% Jackknife UCL	36.85
		95% Standard Bootstrap UCL	36.7
Anderson-Darling Test Statistic	9.811	95% Bootstrap-t UCL	40.19
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL	63.5
Kolmogorov-Smirnov Test Statistic	0.491	95% Percentile Bootstrap UCL	37.12
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	40.12
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	46.28
		97.5% Chebyshev(Mean, Sd) UCL	52.93
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	66
95% Approximate Gamma UCL	38.62		
95% Adjusted Gamma UCL	38.99		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 46.28

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

227-02.wst
 OFF
 95%
 2000

Beryllium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 6

Raw Statistics

Minimum 0.452
 Maximum 0.7
 Mean 0.521
 Median 0.521
 SD 0.0371
 Coefficient of Variation 0.0712
 Skewness 3.655

Log-transformed Statistics

Minimum of Log Data -0.794
 Maximum of Log Data -0.357
 Mean of log Data -0.655
 SD of log Data 0.0646

Relevant UCL Statistics

Normal Distribution Test
 Shapiro Wilk Test Statistic 0.431
 Shapiro Wilk Critical Value 0.929
 Data not Normal at 5% Significance Level
 Lognormal Distribution Test
 Shapiro Wilk Test Statistic 0.468
 Shapiro Wilk Critical Value 0.929
 Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.532
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 0.536
 95% Modified-t UCL (Johnson-1978) 0.533

Assuming Lognormal Distribution

95% H-UCL N/A
 95% Chebyshev (MVUE) UCL 0.547
 97.5% Chebyshev (MVUE) UCL 0.559
 99% Chebyshev (MVUE) UCL 0.581

Gamma Distribution Test

k star (bias corrected) 210.3
 Theta Star 0.00248
 MLE of Mean 0.521
 MLE of Standard Deviation 0.0359
 nu star 13036

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.0413
 Adjusted Chi Square Value 12757

Nonparametric Statistics

95% CLT UCL 0.532
 95% Jackknife UCL 0.532
 95% Standard Bootstrap UCL 0.532

Anderson-Darling Test Statistic 7.411

95% Bootstrap-t UCL 0.538

Anderson-Darling 5% Critical Value 0.745

95% Hall's Bootstrap UCL 0.585

Kolmogorov-Smirnov Test Statistic 0.459

95% Percentile Bootstrap UCL 0.533

Kolmogorov-Smirnov 5% Critical Value 0.157

95% BCA Bootstrap UCL 0.54

Data not Gamma Distributed at 5% Significance Level

95% Chebyshev(Mean, Sd) UCL 0.55

97.5% Chebyshev(Mean, Sd) UCL 0.562

Assuming Gamma Distribution

99% Chebyshev(Mean, Sd) UCL 0.587

95% Approximate Gamma UCL 0.532

95% Adjusted Gamma UCL 0.532

Potential UCL to Use

Use 95% Student's-t UCL 0.532
 or 95% Modified-t UCL 0.533

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	8.62	Minimum of Log Data	2.154
Maximum	85	Maximum of Log Data	4.443
Mean	48.45	Mean of log Data	3.719
Median	48.45	SD of log Data	0.66
SD	22.87		
Coefficient of Variation	0.472		
Skewness	0.0544		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.838	Shapiro Wilk Test Statistic	0.758
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	55.42	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	65.74
95% Adjusted-CLT UCL (Chen-1995)	55.25	95% Chebyshev (MVUE) UCL	79.06
95% Modified-t UCL (Johnson-1978)	55.43	97.5% Chebyshev (MVUE) UCL	91.27
		99% Chebyshev (MVUE) UCL	115.3

Gamma Distribution Test

k star (bias corrected)	2.966	Data Distribution	
Theta Star	16.34	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	48.45		
MLE of Standard Deviation	28.13		
nu star	183.9		
Approximate Chi Square Value (.05)	153.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	55.2
Adjusted Chi Square Value	152	95% Jackknife UCL	55.42
		95% Standard Bootstrap UCL	55.33
Anderson-Darling Test Statistic	2.745	95% Bootstrap-t UCL	55.54
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	55.5
Kolmogorov-Smirnov Test Statistic	0.316	95% Percentile Bootstrap UCL	55.2
Kolmogorov-Smirnov 5% Critical Value	0.159	95% BCA Bootstrap UCL	55.35
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	66.35
		97.5% Chebyshev(Mean, Sd) UCL	74.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	89.32
95% Approximate Gamma UCL	58.03		
95% Adjusted Gamma UCL	58.62		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 66.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	2.97 Minimum of Log Data	1.089
Maximum	14.8 Maximum of Log Data	2.695
Mean	8.436 Mean of log Data	2.107
Median	8.436 SD of log Data	0.244
SD	1.806	
Coefficient of Variation	0.214	
Skewness	0.707	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.566 Shapiro Wilk Test Statistic	0.533
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.986	Assuming Lognormal Distribution	95% H-UCL	9.168
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL	10.1
95% Adjusted-CLT UCL (Chen-1995)	9.013		97.5% Chebyshev (MVUE) UCL	10.81
95% Modified-t UCL (Johnson-1978)	8.993		99% Chebyshev (MVUE) UCL	12.2

Gamma Distribution Test

k star (bias corrected)	18.03	Data Distribution	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.468			
MLE of Mean	8.436			
MLE of Standard Deviation	1.987			
nu star	1118			
Approximate Chi Square Value (.05)	1041	Nonparametric Statistics		
Adjusted Level of Significance	0.0413	95% CLT UCL		8.969
Adjusted Chi Square Value	1037	95% Jackknife UCL		8.986
		95% Standard Bootstrap UCL		8.963
Anderson-Darling Test Statistic	7.019	95% Bootstrap-t UCL		9.017
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL		9.346
Kolmogorov-Smirnov Test Statistic	0.433	95% Percentile Bootstrap UCL		8.95
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL		9.015
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL		9.85
		97.5% Chebyshev(Mean, Sd) UCL		10.46
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL		11.66
95% Approximate Gamma UCL	9.057			
95% Adjusted Gamma UCL	9.093			

Potential UCL to Use

Use 95% Student's-t UCL	8.986
or 95% Modified-t UCL	8.993

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	-0.00684	Log Statistics Not Available	
Maximum	0.0347		
Mean	0.00885		
Median	0.00885		
SD	0.00617		
Coefficient of Variation	0.697		
Skewness	1.596		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.463	Not Available	
Shapiro Wilk Critical Value	0.929		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Student's-t UCL	0.0107	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.0107	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.011
		95% Modified-t UCL (Johnson-1978)	0.0108

Gamma Distribution Test

Gamma Statistics Not Available		Data Distribution	
		Data do not follow a Discernable Distribution (0.05)	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0137	95% CLT UCL	0.0107
		95% Jackknife UCL	0.0107
		95% Standard Bootstrap UCL	0.0107
		95% Bootstrap-t UCL	0.0109
		95% Hall's Bootstrap UCL	0.0129
		95% Percentile Bootstrap UCL	0.0107
		95% BCA Bootstrap UCL	0.0109
		95% Chebyshev(Mean, Sd) UCL	0.0137
		97.5% Chebyshev(Mean, Sd) UCL	0.0158
		99% Chebyshev(Mean, Sd) UCL	0.0199

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 7

Raw Statistics	Log-transformed Statistics	
Minimum	0.072 Minimum of Log Data	-2.631
Maximum	10 Maximum of Log Data	2.303
Mean	7.256 Mean of log Data	1.533
Median	7.256 SD of log Data	1.529
SD	3.061	
Coefficient of Variation	0.422	
Skewness	-1.557	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.694 Shapiro Wilk Test Statistic	0.482
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.189	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	35.62
95% Adjusted-CLT UCL (Chen-1995)	7.996	95% Chebyshev (MVUE) UCL	34.94
95% Modified-t UCL (Johnson-1978)	8.163	97.5% Chebyshev (MVUE) UCL	44.06
		99% Chebyshev (MVUE) UCL	62

Gamma Distribution Test

k star (bias corrected)	1.154	Data Distribution	
Theta Star	6.29	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.256		
MLE of Standard Deviation	6.756		
nu star	71.52		
Approximate Chi Square Value (.05)	53.05	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	8.16
Adjusted Chi Square Value	52.17	95% Jackknife UCL	8.189
		95% Standard Bootstrap UCL	8.159
Anderson-Darling Test Statistic	7.072	95% Bootstrap-t UCL	8.024
Anderson-Darling 5% Critical Value	0.77	95% Hall's Bootstrap UCL	8.066
Kolmogorov-Smirnov Test Statistic	0.489	95% Percentile Bootstrap UCL	8.09
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	8.035
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.652
		97.5% Chebyshev(Mean, Sd) UCL	10.69
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.73
95% Approximate Gamma UCL	9.782		
95% Adjusted Gamma UCL	9.948		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 9.652

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	4.52	Minimum of Log Data	1.509
Maximum	192.4	Maximum of Log Data	5.26
Mean	93.88	Mean of log Data	4.365
Median	93.88	SD of log Data	0.787
SD	39.68		
Coefficient of Variation	0.423		
Skewness	0.0973		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.801	Shapiro Wilk Test Statistic	0.603
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	106	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	146.9
95% Adjusted-CLT UCL (Chen-1995)	105.7	95% Chebyshev (MVUE) UCL	177.7
95% Modified-t UCL (Johnson-1978)	106	97.5% Chebyshev (MVUE) UCL	208.8
		99% Chebyshev (MVUE) UCL	269.9

Gamma Distribution Test

k star (bias corrected)	2.711	Data Distribution	
Theta Star	34.63	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	93.88		
MLE of Standard Deviation	57.01		
nu star	168.1		
Approximate Chi Square Value (.05)	139.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	105.6
Adjusted Chi Square Value	137.6	95% Jackknife UCL	106
		95% Standard Bootstrap UCL	105.5
Anderson-Darling Test Statistic	4.532	95% Bootstrap-t UCL	105.2
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	107.7
Kolmogorov-Smirnov Test Statistic	0.351	95% Percentile Bootstrap UCL	105.5
Kolmogorov-Smirnov 5% Critical Value	0.159	95% BCA Bootstrap UCL	105.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	124.9
		97.5% Chebyshev(Mean, Sd) UCL	138.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	164.8
95% Approximate Gamma UCL	113.4		
95% Adjusted Gamma UCL	114.6		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 124.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 19

Raw Statistics

		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	12.6	Maximum of Log Data	2.534
Mean	3.553	Mean of log Data	0.727
Median	3.553	SD of log Data	1.316
SD	2.897		
Coefficient of Variation	0.815		
Skewness	1.143		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.877	Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	4.436	95% H-UCL	9.689
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.6
95% Adjusted-CLT UCL (Chen-1995)	4.523	97.5% Chebyshev (MVUE) UCL	13.16
95% Modified-t UCL (Johnson-1978)	4.454	99% Chebyshev (MVUE) UCL	18.19

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.978	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.632		
MLE of Mean	3.553		
MLE of Standard Deviation	3.592		
nu star	60.66		
Approximate Chi Square Value (.05)	43.75	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	4.409
Adjusted Chi Square Value	42.95	95% Jackknife UCL	4.436
		95% Standard Bootstrap UCL	4.416
Anderson-Darling Test Statistic	1.21	95% Bootstrap-t UCL	4.61
Anderson-Darling 5% Critical Value	0.774	95% Hall's Bootstrap UCL	4.719
Kolmogorov-Smirnov Test Statistic	0.175	95% Percentile Bootstrap UCL	4.433
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	4.491
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.821
		97.5% Chebyshev(Mean, Sd) UCL	6.802
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.73
95% Approximate Gamma UCL	4.927		
95% Adjusted Gamma UCL	5.018		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.821

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0656	Minimum of Log Data	-2.724
Maximum	0.49	Maximum of Log Data	-0.713
Mean	0.326	Mean of log Data	-1.167
Median	0.326	SD of log Data	0.367
SD	0.0788		
Coefficient of Variation	0.242		
Skewness	-1.12		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.562	Shapiro Wilk Test Statistic	0.457
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.35	95% H-UCL	0.376
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.43
95% Adjusted-CLT UCL (Chen-1995)	0.347	97.5% Chebyshev (MVUE) UCL	0.472
95% Modified-t UCL (Johnson-1978)	0.35	99% Chebyshev (MVUE) UCL	0.555

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.747	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0335		
MLE of Mean	0.326		
MLE of Standard Deviation	0.105		
nu star	604.3		
Approximate Chi Square Value (.05)	548.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.35
Adjusted Chi Square Value	545.3	95% Jackknife UCL	0.35
		95% Standard Bootstrap UCL	0.349
Anderson-Darling Test Statistic	7.45	95% Bootstrap-t UCL	0.347
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.351
Kolmogorov-Smirnov Test Statistic	0.476	95% Percentile Bootstrap UCL	0.349
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	0.346
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.388
		97.5% Chebyshev(Mean, Sd) UCL	0.415
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.467
95% Approximate Gamma UCL	0.36		
95% Adjusted Gamma UCL	0.362		

Potential UCL to Use

Use 95% Student's-t UCL 0.35
or 95% Modified-t UCL 0.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	1.11	Minimum of Log Data	0.104
Maximum	200	Maximum of Log Data	5.298
Mean	25.1	Mean of log Data	2.891
Median	25.1	SD of log Data	0.808
SD	33.32		
Coefficient of Variation	1.328		
Skewness	5.107		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.361	Shapiro Wilk Test Statistic	0.761
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	35.26	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	34.6
95% Adjusted-CLT UCL (Chen-1995)	40.81	95% Chebyshev (MVUE) UCL	41.88
95% Modified-t UCL (Johnson-1978)	36.17	97.5% Chebyshev (MVUE) UCL	49.34
		99% Chebyshev (MVUE) UCL	63.99

Gamma Distribution Test

k star (bias corrected)	1.517	Data Distribution	
Theta Star	16.55	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	25.1		
MLE of Standard Deviation	20.38		
nu star	94.04		
Approximate Chi Square Value (.05)	72.68	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	34.94
Adjusted Chi Square Value	71.64	95% Jackknife UCL	35.26
		95% Standard Bootstrap UCL	35.06
Anderson-Darling Test Statistic	3.46	95% Bootstrap-t UCL	55.55
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL	77.56
Kolmogorov-Smirnov Test Statistic	0.365	95% Percentile Bootstrap UCL	36.39
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	43.41
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	51.19
		97.5% Chebyshev(Mean, Sd) UCL	62.47
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	84.65
95% Approximate Gamma UCL	32.48		
95% Adjusted Gamma UCL	32.95		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 51.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.373 Minimum of Log Data	-0.986
Maximum	2.45 Maximum of Log Data	0.896
Mean	1.473 Mean of log Data	0.352
Median	1.473 SD of log Data	0.309
SD	0.328	
Coefficient of Variation	0.223	
Skewness	-0.715	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.573 Shapiro Wilk Test Statistic	0.478
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.573	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.65
95% Adjusted-CLT UCL (Chen-1995)	1.562	95% Chebyshev (MVUE) UCL	1.856
95% Modified-t UCL (Johnson-1978)	1.572	97.5% Chebyshev (MVUE) UCL	2.014
		99% Chebyshev (MVUE) UCL	2.326

Gamma Distribution Test

k star (bias corrected)	12.84	Data Distribution	
Theta Star	0.115	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.473		
MLE of Standard Deviation	0.411		
nu star	796.1		
Approximate Chi Square Value (.05)	731.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	1.57
Adjusted Chi Square Value	728.2	95% Jackknife UCL	1.573
		95% Standard Bootstrap UCL	1.568
Anderson-Darling Test Statistic	7.344	95% Bootstrap-t UCL	1.561
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	1.575
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	1.563
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	1.556
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.73
		97.5% Chebyshev(Mean, Sd) UCL	1.841
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.06
95% Approximate Gamma UCL	1.603		
95% Adjusted Gamma UCL	1.61		

Potential UCL to Use

Use 95% Student's-t UCL	1.573
or 95% Modified-t UCL	1.572

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File 165-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 4

Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	6260	Minimum of Log Data	8.742
Maximum	13000	Maximum of Log Data	9.473
Mean	8156	Mean of log Data	9.002
Median	8088	SD of log Data	0.0921
SD	889.6		
Coefficient of Variation	0.109		
Skewness	4.576		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.308	Shapiro Wilk Test Statistic	0.345
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	8407	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8699
95% Adjusted-CLT UCL (Chen-1995)	8521	97.5% Chebyshev (MVUE) UCL	8935
95% Modified-t UCL (Johnson-1978)	8426	99% Chebyshev (MVUE) UCL	9400

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	100.3	Data do not follow a Discernable Distribution (0.05)	
Theta Star	81.35		
MLE of Mean	8156		
MLE of Standard Deviation	814.5		
nu star	7219		
Approximate Chi Square Value (.05)	7023	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	8400
Adjusted Chi Square Value	7014	95% Jackknife UCL	8407
		95% Standard Bootstrap UCL	8399
Anderson-Darling Test Statistic	11.06	95% Bootstrap-t UCL	8884
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	9827
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	8447
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	8480
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8802
		97.5% Chebyshev(Mean, Sd) UCL	9082
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9631
95% Approximate Gamma UCL	8384		
95% Adjusted Gamma UCL	8395		

Potential UCL to Use Use 95% Student's-t UCL 8407
 or 95% Modified-t UCL 8426

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	2.2	Minimum of Log Data	0.788
Maximum	10	Maximum of Log Data	2.303
Mean	8.274	Mean of log Data	2.096
Median	8.36	SD of log Data	0.228
SD	1.101		
Coefficient of Variation	0.133		
Skewness	-4.88		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.302	Shapiro Wilk Test Statistic	0.241
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.585	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.925
95% Adjusted-CLT UCL (Chen-1995)	8.417	95% Chebyshev (MVUE) UCL	9.731
95% Modified-t UCL (Johnson-1978)	8.56	97.5% Chebyshev (MVUE) UCL	10.33
		99% Chebyshev (MVUE) UCL	11.52

Gamma Distribution Test

k star (bias corrected)	26.5	Data Distribution	
Theta Star	0.312	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.274		
MLE of Standard Deviation	1.607		
nu star	1908		
Approximate Chi Square Value (.05)	1808	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	8.576
Adjusted Chi Square Value	1803	95% Jackknife UCL	8.585
		95% Standard Bootstrap UCL	8.578
Anderson-Darling Test Statistic	11.57	95% Bootstrap-t UCL	8.489
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	8.462
Kolmogorov-Smirnov Test Statistic	0.519	95% Percentile Bootstrap UCL	8.526
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	8.486
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.074
		97.5% Chebyshev(Mean, Sd) UCL	9.421
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.1
95% Approximate Gamma UCL	8.734		
95% Adjusted Gamma UCL	8.756		

Potential UCL to Use		Use 95% Student's-t UCL	8.585
		or 95% Modified-t UCL	8.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	5	Minimum of Log Data	1.609
Maximum	130.4	Maximum of Log Data	4.87
Mean	50.6	Mean of log Data	3.838
Median	50.63	SD of log Data	0.509
SD	18.03		
Coefficient of Variation	0.356		
Skewness	1.844		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.505	Shapiro Wilk Test Statistic	0.461
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	55.68	95% H-UCL	62.31
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	73.01
95% Adjusted-CLT UCL (Chen-1995)	56.53	97.5% Chebyshev (MVUE) UCL	81.84
95% Modified-t UCL (Johnson-1978)	55.83	99% Chebyshev (MVUE) UCL	99.16

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.493	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.213		
MLE of Mean	50.6		
MLE of Standard Deviation	21.59		
nu star	395.5		
Approximate Chi Square Value (.05)	350.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	55.54
Adjusted Chi Square Value	348.4	95% Jackknife UCL	55.68
		95% Standard Bootstrap UCL	55.57
Anderson-Darling Test Statistic	9.07	95% Bootstrap-t UCL	56.73
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	62.14
Kolmogorov-Smirnov Test Statistic	0.472	95% Percentile Bootstrap UCL	55.52
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	56.76
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	63.7
		97.5% Chebyshev(Mean, Sd) UCL	69.37
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	80.51
95% Approximate Gamma UCL	57.11		
95% Adjusted Gamma UCL	57.43		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 63.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	71.8	Log-transformed Statistics	
Maximum	1140	Minimum of Log Data	4.274
Mean	481.4	Maximum of Log Data	7.039
Median	471.7	Mean of log Data	6.114
SD	154.6	SD of log Data	0.416
Coefficient of Variation	0.321		
Skewness	1.757		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.492	Shapiro Wilk Test Statistic	0.452
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	525	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	561.4
95% Adjusted-CLT UCL (Chen-1995)	531.9	95% Chebyshev (MVUE) UCL	645
95% Modified-t UCL (Johnson-1978)	526.2	97.5% Chebyshev (MVUE) UCL	711.4
		99% Chebyshev (MVUE) UCL	841.8

Gamma Distribution Test

k star (bias corrected)	7.455	Data Distribution	
Theta Star	64.58	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	481.4		
MLE of Standard Deviation	176.3		
nu star	536.8		
Approximate Chi Square Value (.05)	484.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	523.8
Adjusted Chi Square Value	481.8	95% Jackknife UCL	525
		95% Standard Bootstrap UCL	522.6
Anderson-Darling Test Statistic	9.326	95% Bootstrap-t UCL	535.9
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	669.3
Kolmogorov-Smirnov Test Statistic	0.468	95% Percentile Bootstrap UCL	526.1
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	533.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	593.7
		97.5% Chebyshev(Mean, Sd) UCL	642.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	737.7
95% Approximate Gamma UCL	533.9		
95% Adjusted Gamma UCL	536.4		

Potential UCL to Use

Use 95% Student's-t UCL 525
or 95% Modified-t UCL 526.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.506	Minimum of Log Data	-0.681
Maximum	1.08	Maximum of Log Data	0.077
Mean	0.794	Mean of log Data	-0.234
Median	0.794	SD of log Data	0.0922
SD	0.0686		
Coefficient of Variation	0.0864		
Skewness	-0.0684		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.335	Shapiro Wilk Test Statistic	0.324
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.814	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.813	95% Chebyshev (MVUE) UCL	0.848
95% Modified-t UCL (Johnson-1978)	0.814	97.5% Chebyshev (MVUE) UCL	0.871
		99% Chebyshev (MVUE) UCL	0.916

Gamma Distribution Test

k star (bias corrected)	117.7	Data Distribution	
Theta Star	0.00675	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.794		
MLE of Standard Deviation	0.0732		
nu star	8473		
Approximate Chi Square Value (.05)	8260	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	0.813
Adjusted Chi Square Value	8250	95% Jackknife UCL	0.814
		95% Standard Bootstrap UCL	0.813
Anderson-Darling Test Statistic	11.67	95% Bootstrap-t UCL	0.811
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.818
Kolmogorov-Smirnov Test Statistic	0.484	95% Percentile Bootstrap UCL	0.811
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	0.81
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.844
		97.5% Chebyshev(Mean, Sd) UCL	0.866
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.908
95% Approximate Gamma UCL	0.815		
95% Adjusted Gamma UCL	0.816		

Potential UCL to Use		Use 95% Student's-t UCL	0.814
		or 95% Modified-t UCL	0.814

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics
Minimum	-0.0145 Log Statistics Not Available
Maximum	8.65
Mean	2.661
Median	2.576
SD	1.115
Coefficient of Variation	0.419
Skewness	4.263

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.306 Not Available
Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	2.975 95% H-UCL	N/A
Assuming Normal Distribution	95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.975 95% Adjusted-CLT UCL (Chen 1995)	3.107
	95% Modified-t UCL (Johnson-1978)	2.997

Gamma Distribution Test	Data Distribution
Gamma Statistics Not Available	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use		
Use 95% Chebyshev (Mean, Sd) UCL	3.471	95% CLT UCL
		2.966
		95% Jackknife UCL
		2.975
		95% Standard Bootstrap UCL
		2.957
		95% Bootstrap-t UCL
		3.835
		95% Hall's Bootstrap UCL
		5.294
		95% Percentile Bootstrap UCL
		2.998
		95% BCA Bootstrap UCL
		3.07
		95% Chebyshev(Mean, Sd) UCL
		3.471
		97.5% Chebyshev(Mean, Sd) UCL
		3.822
		99% Chebyshev(Mean, Sd) UCL
		4.51

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	14.85	Log-transformed Statistics	
Maximum	66.62	Minimum of Log Data	2.698
Mean	34.16	Maximum of Log Data	4.199
Median	34.4	Mean of log Data	3.514
SD	6.734	SD of log Data	0.194
Coefficient of Variation	0.197		
Skewness	2.537		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.441	Shapiro Wilk Test Statistic	0.477
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	36.06	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	36.2
95% Adjusted-CLT UCL (Chen-1995)	36.52	95% Chebyshev (MVUE) UCL	39.03
95% Modified-t UCL (Johnson-1978)	36.14	97.5% Chebyshev (MVUE) UCL	41.13
		99% Chebyshev (MVUE) UCL	45.25

Gamma Distribution Test

k star (bias corrected)	26.22	Data Distribution	
Theta Star	1.303	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	34.16		
MLE of Standard Deviation	6.672		
nu star	1888		
Approximate Chi Square Value (.05)	1788	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	36.01
Adjusted Chi Square Value	1784	95% Jackknife UCL	36.06
		95% Standard Bootstrap UCL	36
Anderson-Darling Test Statistic	9.081	95% Bootstrap-t UCL	36.54
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	47.03
Kolmogorov-Smirnov Test Statistic	0.433	95% Percentile Bootstrap UCL	36.06
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	36.66
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.06
		97.5% Chebyshev(Mean, Sd) UCL	41.17
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	45.33
95% Approximate Gamma UCL	36.07		
95% Adjusted Gamma UCL	36.16		

Potential UCL to Use

Use 95% Student's-t UCL	36.06
or 95% Modified-t UCL	36.14

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.6	Minimum of Log Data	1.723
Maximum	13.1	Maximum of Log Data	2.573
Mean	8.169	Mean of log Data	2.095
Median	8.1	SD of log Data	0.102
SD	0.942		
Coefficient of Variation	0.115		
Skewness	3.72		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.3	Shapiro Wilk Test Statistic	0.326
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	8.435	95% H-UCL	8.411
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.775
95% Adjusted-CLT UCL (Chen-1995)	8.532	97.5% Chebyshev (MVUE) UCL	9.039
95% Modified-t UCL (Johnson-1978)	8.451	99% Chebyshev (MVUE) UCL	9.556

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	84.49	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0967		
MLE of Mean	8.169		
MLE of Standard Deviation	0.889		
nu star	6084		
Approximate Chi Square Value (.05)	5903	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	8.428
Adjusted Chi Square Value	5895	95% Jackknife UCL	8.435
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	11.81	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.491	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.854
		97.5% Chebyshev(Mean, Sd) UCL	9.15
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.732
95% Approximate Gamma UCL	8.419		
95% Adjusted Gamma UCL	8.43		

Potential UCL to Use		Use 95% Student's-t UCL	8.435
		or 95% Modified-t UCL	8.451

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.097	Minimum of Log Data	-2.333
Maximum	0.9	Maximum of Log Data	-0.105
Mean	0.345	Mean of log Data	-1.112
Median	0.351	SD of log Data	0.327
SD	0.113		
Coefficient of Variation	0.329		
Skewness	2.944		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.452	Shapiro Wilk Test Statistic	0.524
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.377	95% H-UCL	0.383
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.43
95% Adjusted-CLT UCL (Chen-1995)	0.386	97.5% Chebyshev (MVUE) UCL	0.467
95% Modified-t UCL (Johnson-1978)	0.379	99% Chebyshev (MVUE) UCL	0.538

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.752	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0354		
MLE of Mean	0.345		
MLE of Standard Deviation	0.11		
nu star	702.2		
Approximate Chi Square Value (.05)	641.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	0.376
Adjusted Chi Square Value	639.1	95% Jackknife UCL	0.377
		95% Standard Bootstrap UCL	0.376
Anderson-Darling Test Statistic	8.845	95% Bootstrap-t UCL	0.385
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	0.546
Kolmogorov-Smirnov Test Statistic	0.451	95% Percentile Bootstrap UCL	0.377
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	0.388
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.427
		97.5% Chebyshev(Mean, Sd) UCL	0.463
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.533
95% Approximate Gamma UCL	0.378		
95% Adjusted Gamma UCL	0.379		

Potential UCL to Use

Use 95% Student's-t UCL	0.377
or 95% Modified-t UCL	0.379

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	0.38	Log-transformed Statistics	
Maximum	4.7	Minimum of Log Data	-0.968
Mean	1.328	Maximum of Log Data	1.548
Median	1.293	Mean of log Data	0.211
SD	0.63	SD of log Data	0.383
Coefficient of Variation	0.474		
Skewness	4.397		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.38	Shapiro Wilk Test Statistic	0.511
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.505	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.496
95% Adjusted-CLT UCL (Chen-1995)	1.583	95% Chebyshev (MVUE) UCL	1.705
95% Modified-t UCL (Johnson-1978)	1.518	97.5% Chebyshev (MVUE) UCL	1.869
		99% Chebyshev (MVUE) UCL	2.191

Gamma Distribution Test

k star (bias corrected)	6.475	Data Distribution	
Theta Star	0.205	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.328		
MLE of Standard Deviation	0.522		
nu star	466.2		
Approximate Chi Square Value (.05)	417.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	1.501
Adjusted Chi Square Value	415.1	95% Jackknife UCL	1.505
		95% Standard Bootstrap UCL	1.498
Anderson-Darling Test Statistic	9.018	95% Bootstrap-t UCL	1.633
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	2.329
Kolmogorov-Smirnov Test Statistic	0.438	95% Percentile Bootstrap UCL	1.516
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	1.599
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.786
		97.5% Chebyshev(Mean, Sd) UCL	1.984
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.372
95% Approximate Gamma UCL	1.484		
95% Adjusted Gamma UCL	1.492		

Potential UCL to Use

Use 95% Student's-t UCL	1.505
or 95% Modified-t UCL	1.518

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.06	Minimum of Log Data	-2.813
Maximum	0.56	Maximum of Log Data	-0.58
Mean	0.407	Mean of log Data	-0.932
Median	0.411	SD of log Data	0.33
SD	0.068		
Coefficient of Variation	0.167		
Skewness	-3.518		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.395	Shapiro Wilk Test Statistic	0.274
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.426	95% H-UCL	0.46
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.517
95% Adjusted-CLT UCL (Chen-1995)	0.418	97.5% Chebyshev (MVUE) UCL	0.561
95% Modified-t UCL (Johnson-1978)	0.425	99% Chebyshev (MVUE) UCL	0.648

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	14.31	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0284		
MLE of Mean	0.407		
MLE of Standard Deviation	0.108		
nu star	1030		
Approximate Chi Square Value (.05)	956.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	0.425
Adjusted Chi Square Value	953.5	95% Jackknife UCL	0.426
		95% Standard Bootstrap UCL	0.426
Anderson-Darling Test Statistic	10.67	95% Bootstrap-t UCL	0.422
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.421
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	0.423
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	0.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.456
		97.5% Chebyshev(Mean, Sd) UCL	0.478
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.52
95% Approximate Gamma UCL	0.438		
95% Adjusted Gamma UCL	0.44		

Potential UCL to Use

Use 95% Student's-t UCL	0.426
or 95% Modified-t UCL	0.425

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	16.1	Log-transformed Statistics	
Maximum	39.2	Minimum of Log Data	2.779
Mean	32.69	Maximum of Log Data	3.669
Median	32.99	Mean of log Data	3.481
SD	3.072	SD of log Data	0.125
Coefficient of Variation	0.094		
Skewness	-4.484		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.351	Shapiro Wilk Test Statistic	0.299
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	33.56	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	33.94
95% Adjusted-CLT UCL (Chen-1995)	33.13	95% Chebyshev (MVUE) UCL	35.71
95% Modified-t UCL (Johnson-1978)	33.49	97.5% Chebyshev (MVUE) UCL	37
		99% Chebyshev (MVUE) UCL	39.53

Gamma Distribution Test

k star (bias corrected)	73.76	Data Distribution	
Theta Star	0.443	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	32.69		
MLE of Standard Deviation	3.807		
nu star	5311		
Approximate Chi Square Value (.05)	5142	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	33.53
Adjusted Chi Square Value	5135	95% Jackknife UCL	33.56
		95% Standard Bootstrap UCL	33.53
Anderson-Darling Test Statistic	10.57	95% Bootstrap-t UCL	33.36
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	33.26
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	33.4
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	33.24
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	34.92
		97.5% Chebyshev(Mean, Sd) UCL	35.89
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	37.79
95% Approximate Gamma UCL	33.76		
95% Adjusted Gamma UCL	33.81		

Potential UCL to Use

Use 95% Student's-t UCL	33.56
or 95% Modified-t UCL	33.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	0.008	Minimum of Log Data	-4.828
Maximum	51	Maximum of Log Data	3.932
Mean	3.697	Mean of log Data	0.125
Median	2	SD of log Data	1.74
SD	8.526		
Coefficient of Variation	2.306		
Skewness	5.177		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.387	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	6.098	95% H-UCL	13.77
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.63
95% Adjusted-CLT UCL (Chen-1995)	7.344	97.5% Chebyshev (MVUE) UCL	16.07
95% Modified-t UCL (Johnson-1978)	6.302	99% Chebyshev (MVUE) UCL	22.82

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.506	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.301		
MLE of Mean	3.697		
MLE of Standard Deviation	5.195		
nu star	36.46		
Approximate Chi Square Value (.05)	23.64	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	6.034
Adjusted Chi Square Value	23.17	95% Jackknife UCL	6.098
		95% Standard Bootstrap UCL	5.957
Anderson-Darling Test Statistic	1.251	95% Bootstrap-t UCL	11.21
Anderson-Darling 5% Critical Value	0.809	95% Hall's Bootstrap UCL	13.95
Kolmogorov-Smirnov Test Statistic	0.242	95% Percentile Bootstrap UCL	6.447
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	8.017
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.891
		97.5% Chebyshev(Mean, Sd) UCL	12.57
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.84
95% Approximate Gamma UCL	5.702		
95% Adjusted Gamma UCL	5.818		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 9.891

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Pentachlorophenol

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	3
Number of Missing Values	1		

Raw Statistics

Log-transformed Statistics

Minimum	1.7	Minimum of Log Data	0.531
Maximum	2.1	Maximum of Log Data	0.742
Mean	1.963	Mean of log Data	0.674
Median	1.967	SD of log Data	0.0269
SD	0.0503		
Coefficient of Variation	0.0256		
Skewness	-3.72		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.3	Shapiro Wilk Test Statistic	0.291
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Lognormal Distribution

95% Student's-t UCL	1.977	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.001
95% Adjusted-CLT UCL (Chen-1995)	1.971	97.5% Chebyshev (MVUE) UCL	2.018
95% Modified-t UCL (Johnson-1978)	1.976	99% Chebyshev (MVUE) UCL	2.051

Gamma Distribution Test

Data Distribution

k star (bias corrected)	1347	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00146		
MLE of Mean	1.963		
MLE of Standard Deviation	0.0535		
nu star	96960		
Approximate Chi Square Value (.05)	96237	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	1.977
Adjusted Chi Square Value	96205	95% Jackknife UCL	1.977
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	11.91	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.504	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.999
		97.5% Chebyshev(Mean, Sd) UCL	2.015
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.046
95% Approximate Gamma UCL	1.978		
95% Adjusted Gamma UCL	1.978		

Potential UCL to Use	Use 95% Student's-t UCL	1.977
	or 95% Modified-t UCL	1.976

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Plutonium-239/240

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 4

Raw Statistics		Log-transformed Statistics	
Minimum	0.00963	Minimum of Log Data	-4.643
Maximum	7.78	Maximum of Log Data	2.052
Mean	2.045	Mean of log Data	0.547
Median	1.964	SD of log Data	0.926
SD	1.046		
Coefficient of Variation	0.512		
Skewness	4.729		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.307	Shapiro Wilk Test Statistic	0.282
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.339	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3.804
95% Adjusted-CLT UCL (Chen-1995)	2.478	95% Chebyshev (MVUE) UCL	4.614
95% Modified-t UCL (Johnson-1978)	2.362	97.5% Chebyshev (MVUE) UCL	5.481
		99% Chebyshev (MVUE) UCL	7.185

Gamma Distribution Test

k star (bias corrected)	2.886	Data Distribution	
Theta Star	0.708	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.045		
MLE of Standard Deviation	1.204		
nu star	207.8		
Approximate Chi Square Value (.05)	175.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	2.331
Adjusted Chi Square Value	174.1	95% Jackknife UCL	2.339
		95% Standard Bootstrap UCL	2.34
Anderson-Darling Test Statistic	11.02	95% Bootstrap-t UCL	2.751
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	3.844
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	2.394
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	2.502
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.805
		97.5% Chebyshev(Mean, Sd) UCL	3.134
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.78
95% Approximate Gamma UCL	2.422		
95% Adjusted Gamma UCL	2.44		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.805

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	0.22	Log-transformed Statistics	
Maximum	83.3	Minimum of Log Data	-1.514
Mean	22.21	Maximum of Log Data	4.422
Median	22.52	Mean of log Data	2.897
SD	12	SD of log Data	0.914
Coefficient of Variation	0.541		
Skewness	3.549		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.424	Shapiro Wilk Test Statistic	0.435
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	25.59	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	39.17
95% Adjusted-CLT UCL (Chen-1995)	26.76	95% Chebyshev (MVUE) UCL	47.53
95% Modified-t UCL (Johnson-1978)	25.79	97.5% Chebyshev (MVUE) UCL	56.38
		99% Chebyshev (MVUE) UCL	73.76

Gamma Distribution Test

k star (bias corrected)	2.417	Data Distribution	
Theta Star	9.189	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	22.21		
MLE of Standard Deviation	14.29		
nu star	174		
Approximate Chi Square Value (.05)	144.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	25.5
Adjusted Chi Square Value	143.3	95% Jackknife UCL	25.59
		95% Standard Bootstrap UCL	25.44
Anderson-Darling Test Statistic	9.19	95% Bootstrap-t UCL	26.87
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	42.08
Kolmogorov-Smirnov Test Statistic	0.48	95% Percentile Bootstrap UCL	25.56
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	27.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30.93
		97.5% Chebyshev(Mean, Sd) UCL	34.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	42.12
95% Approximate Gamma UCL	26.74		
95% Adjusted Gamma UCL	26.97		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 30.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

Minimum	0.22	Log-transformed Statistics	
Maximum	11.4	Minimum of Log Data	-1.514
Mean	4.797	Maximum of Log Data	2.434
Median	4.746	Mean of log Data	1.449
SD	1.68	SD of log Data	0.665
Coefficient of Variation	0.35		
Skewness	1.096		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.478	Shapiro Wilk Test Statistic	0.38
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.27	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.688
95% Adjusted-CLT UCL (Chen-1995)	5.312	95% Chebyshev (MVUE) UCL	8.027
95% Modified-t UCL (Johnson-1978)	5.278	97.5% Chebyshev (MVUE) UCL	9.218
		99% Chebyshev (MVUE) UCL	11.56

Gamma Distribution Test

k star (bias corrected)	4.018	Data Distribution	
Theta Star	1.194	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.797		
MLE of Standard Deviation	2.393		
nu star	289.3		
Approximate Chi Square Value (.05)	250.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	5.257
Adjusted Chi Square Value	249.3	95% Jackknife UCL	5.27
		95% Standard Bootstrap UCL	5.253
Anderson-Darling Test Statistic	10.2	95% Bootstrap-t UCL	5.334
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	5.711
Kolmogorov-Smirnov Test Statistic	0.499	95% Percentile Bootstrap UCL	5.285
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	5.285
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.017
		97.5% Chebyshev(Mean, Sd) UCL	6.546
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.583
95% Approximate Gamma UCL	5.531		
95% Adjusted Gamma UCL	5.567		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 6.017

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.47	Minimum of Log Data	-0.755
Maximum	20	Maximum of Log Data	2.996
Mean	6.747	Mean of log Data	1.524
Median	6.299	SD of log Data	0.988
SD	5.82		
Coefficient of Variation	0.863		
Skewness	1.535		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.697	Shapiro Wilk Test Statistic	0.83
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	8.386	95% H-UCL	11.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.41
95% Adjusted-CLT UCL (Chen-1995)	8.608	97.5% Chebyshev (MVUE) UCL	16.04
95% Modified-t UCL (Johnson-1978)	8.427	99% Chebyshev (MVUE) UCL	21.21

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.339	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.037		
MLE of Mean	6.747		
MLE of Standard Deviation	5.83		
nu star	96.44		
Approximate Chi Square Value (.05)	74.79	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	8.343
Adjusted Chi Square Value	73.92	95% Jackknife UCL	8.386
		95% Standard Bootstrap UCL	8.322
Anderson-Darling Test Statistic	2.753	95% Bootstrap-t UCL	8.925
Anderson-Darling 5% Critical Value	0.768	95% Hall's Bootstrap UCL	8.57
Kolmogorov-Smirnov Test Statistic	0.282	95% Percentile Bootstrap UCL	8.462
Kolmogorov-Smirnov 5% Critical Value	0.15	95% BCA Bootstrap UCL	8.574
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.98
		97.5% Chebyshev(Mean, Sd) UCL	12.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.4
95% Approximate Gamma UCL	8.701		
95% Adjusted Gamma UCL	8.802		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 10.98

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	4	Log-transformed Statistics	
Maximum	268	Minimum of Log Data	1.386
Mean	74.76	Maximum of Log Data	5.591
Median	75.3	Mean of log Data	4.045
SD	45.14	SD of log Data	0.964
Coefficient of Variation	0.604		
Skewness	2.361		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.552	Shapiro Wilk Test Statistic	0.538
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	87.47	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	133.3
95% Adjusted-CLT UCL (Chen-1995)	90.29	95% Chebyshev (MVUE) UCL	161.3
95% Modified-t UCL (Johnson-1978)	87.96	97.5% Chebyshev (MVUE) UCL	192.5
		99% Chebyshev (MVUE) UCL	253.7

Gamma Distribution Test

k star (bias corrected)	1.862	Data Distribution	
Theta Star	40.15	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	74.76		
MLE of Standard Deviation	54.78		
nu star	134.1		
Approximate Chi Square Value (.05)	108.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	87.13
Adjusted Chi Square Value	107.3	95% Jackknife UCL	87.47
		95% Standard Bootstrap UCL	87.27
Anderson-Darling Test Statistic	7.941	95% Bootstrap-t UCL	93.35
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	170
Kolmogorov-Smirnov Test Statistic	0.459	95% Percentile Bootstrap UCL	86.91
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	91.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	107.5
		97.5% Chebyshev(Mean, Sd) UCL	121.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	149.6
95% Approximate Gamma UCL	92.53		
95% Adjusted Gamma UCL	93.43		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 107.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

Minimum	0.673	Log-transformed Statistics	
Maximum	140	Minimum of Log Data	-0.396
Mean	43.12	Maximum of Log Data	4.942
Median	43.71	Mean of log Data	3.554
SD	19.97	SD of log Data	0.965
Coefficient of Variation	0.463		
Skewness	2.762		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.418	Shapiro Wilk Test Statistic	0.384
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	48.74	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	81.54
95% Adjusted-CLT UCL (Chen-1995)	50.23	95% Chebyshev (MVUE) UCL	98.71
95% Modified-t UCL (Johnson-1978)	48.99	97.5% Chebyshev (MVUE) UCL	117.8
		99% Chebyshev (MVUE) UCL	155.2

Gamma Distribution Test

k star (bias corrected)	2.342	Data Distribution	
Theta Star	18.41	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	43.12		
MLE of Standard Deviation	28.17		
nu star	168.7		
Approximate Chi Square Value (.05)	139.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	48.59
Adjusted Chi Square Value	138.4	95% Jackknife UCL	48.74
		95% Standard Bootstrap UCL	48.43
Anderson-Darling Test Statistic	10.42	95% Bootstrap-t UCL	50.14
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	79.53
Kolmogorov-Smirnov Test Statistic	0.509	95% Percentile Bootstrap UCL	49.06
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	50.55
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	57.63
		97.5% Chebyshev(Mean, Sd) UCL	63.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	76.24
95% Approximate Gamma UCL	52.08		
95% Adjusted Gamma UCL	52.53		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 57.63

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.076	Minimum of Log Data	-2.577
Maximum	4.7	Maximum of Log Data	1.548
Mean	1.591	Mean of log Data	0.337
Median	1.611	SD of log Data	0.668
SD	0.648		
Coefficient of Variation	0.407		
Skewness	2.577		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.422	Shapiro Wilk Test Statistic	0.401
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.773	95% H-UCL	2.208
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.65
95% Adjusted-CLT UCL (Chen-1995)	1.818	97.5% Chebyshev (MVUE) UCL	3.045
95% Modified-t UCL (Johnson-1978)	1.781	99% Chebyshev (MVUE) UCL	3.82

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.781	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.421		
MLE of Mean	1.591		
MLE of Standard Deviation	0.818		
nu star	272.3		
Approximate Chi Square Value (.05)	235.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	1.768
Adjusted Chi Square Value	233.5	95% Jackknife UCL	1.773
		95% Standard Bootstrap UCL	1.772
Anderson-Darling Test Statistic	10.17	95% Bootstrap-t UCL	1.815
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	2.794
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	1.782
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	1.828
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.061
		97.5% Chebyshev(Mean, Sd) UCL	2.265
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.665
95% Approximate Gamma UCL	1.843		
95% Adjusted Gamma UCL	1.855		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.061

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.87	Minimum of Log Data	-0.139
Maximum	150	Maximum of Log Data	5.011
Mean	48.9	Mean of log Data	3.718
Median	49.58	SD of log Data	0.849
SD	21.03		
Coefficient of Variation	0.43		
Skewness	2.606		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.384
Shapiro Wilk Test Statistic	0.423	Shapiro Wilk Critical Value	0.935
Shapiro Wilk Critical Value	0.935	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	54.82	95% H-UCL	81.22
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	98.6
95% Adjusted-CLT UCL (Chen-1995)	56.29	97.5% Chebyshev (MVUE) UCL	116.1
95% Modified-t UCL (Johnson-1978)	55.08	99% Chebyshev (MVUE) UCL	150.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.83	Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.28		
MLE of Mean	48.9		
MLE of Standard Deviation	29.07		
nu star	203.8		
Approximate Chi Square Value (.05)	171.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	54.67
Adjusted Chi Square Value	170.4	95% Jackknife UCL	54.82
		95% Standard Bootstrap UCL	54.7
Anderson-Darling Test Statistic	10.3	95% Bootstrap-t UCL	56.02
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	87.41
Kolmogorov-Smirnov Test Statistic	0.502	95% Percentile Bootstrap UCL	55.02
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	57.13
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	64.18
		97.5% Chebyshev(Mean, Sd) UCL	70.79
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	83.78
95% Approximate Gamma UCL	58.02		
95% Adjusted Gamma UCL	58.47		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 64.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	165-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	2.2	Minimum of Log Data	0.788
Maximum	10	Maximum of Log Data	2.303
Mean	8.274	Mean of log Data	2.096
Median	8.36	SD of log Data	0.228
SD	1.101		
Coefficient of Variation	0.133		
Skewness	-4.88		

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.302	Shapiro Wilk Test Statistic	0.241
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	8.585	95% H-UCL	8.925
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.731
95% Adjusted-CLT UCL (Chen-1995)	8.417	97.5% Chebyshev (MVUE) UCL	10.33
95% Modified-t UCL (Johnson-1978)	8.56	99% Chebyshev (MVUE) UCL	11.52

Gamma Distribution Test

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	26.5	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.312		
MLE of Mean	8.274		
MLE of Standard Deviation	1.607		
nu star	1908		
Approximate Chi Square Value (.05)	1808	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	8.576
Adjusted Chi Square Value	1803	95% Jackknife UCL	8.585
		95% Standard Bootstrap UCL	8.577
Anderson-Darling Test Statistic	11.57	95% Bootstrap-t UCL	8.485
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	8.464
Kolmogorov-Smirnov Test Statistic	0.519	95% Percentile Bootstrap UCL	8.526
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	8.486
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.074
		97.5% Chebyshev(Mean, Sd) UCL	9.421
		99% Chebyshev(Mean, Sd) UCL	10.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	8.734		
95% Adjusted Gamma UCL	8.756		

Potential UCL to Use

Use 95% Student's-t UCL	8.585
or 95% Modified-t UCL	8.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	2.1 Minimum of Log Data	0.742
Maximum	130.4 Maximum of Log Data	4.87
Mean	50.24 Mean of log Data	3.808
Median	50.31 SD of log Data	0.624
SD	18.25	
Coefficient of Variation	0.363	
Skewness	1.747	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.508 Shapiro Wilk Test Statistic	0.421
Shapiro Wilk Critical Value	0.935 Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	55.38 95% H-UCL	67.65
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	80.78
95% Adjusted-CLT UCL (Chen-1995)	56.19 97.5% Chebyshev (MVUE) UCL	92.2
95% Modified-t UCL (Johnson-1978)	55.53 99% Chebyshev (MVUE) UCL	114.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.388 Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.45	
MLE of Mean	50.24	
MLE of Standard Deviation	23.99	
nu star	315.9	
Approximate Chi Square Value (.05)	275.7 Nonparametric Statistics	
Adjusted Level of Significance	0.0428 95% CLT UCL	55.25
Adjusted Chi Square Value	274 95% Jackknife UCL	55.38
	95% Standard Bootstrap UCL	55.14
Anderson-Darling Test Statistic	9.168 95% Bootstrap-t UCL	56.28
Anderson-Darling 5% Critical Value	0.751 95% Hall's Bootstrap UCL	63.67
Kolmogorov-Smirnov Test Statistic	0.479 95% Percentile Bootstrap UCL	55.55
Kolmogorov-Smirnov 5% Critical Value	0.147 95% BCA Bootstrap UCL	56.03
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	63.5
	97.5% Chebyshev(Mean, Sd) UCL	69.24
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	80.5
95% Approximate Gamma UCL	57.56	
95% Adjusted Gamma UCL	57.92	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 63.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	1140	Maximum of Log Data	7.039
Mean	464.2	Mean of log Data	5.886
Median	456.2	SD of log Data	1.434
SD	165.4		
Coefficient of Variation	0.356		
Skewness	1.284		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.503	Shapiro Wilk Test Statistic	0.28
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	510.7	95% H-UCL	2045
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2219
95% Adjusted-CLT UCL (Chen-1995)	515.8	97.5% Chebyshev (MVUE) UCL	2767
95% Modified-t UCL (Johnson-1978)	511.7	99% Chebyshev (MVUE) UCL	3842

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.963	Data do not follow a Discernable Distribution (0.05)	
Theta Star	236.4		
MLE of Mean	464.2		
MLE of Standard Deviation	331.3		
nu star	141.4		
Approximate Chi Square Value (.05)	114.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	509.5
Adjusted Chi Square Value	113.8	95% Jackknife UCL	510.7
		95% Standard Bootstrap UCL	508
Anderson-Darling Test Statistic	10.4	95% Bootstrap-t UCL	518.6
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	574.2
Kolmogorov-Smirnov Test Statistic	0.526	95% Percentile Bootstrap UCL	510.4
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	516.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	584.3
		97.5% Chebyshev(Mean, Sd) UCL	636.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	738.4
95% Approximate Gamma UCL	571.1		
95% Adjusted Gamma UCL	576.6		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 584.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	1.08	Maximum of Log Data	0.077
Mean	0.649	Mean of log Data	-0.464
Median	0.656	SD of log Data	0.314
SD	0.119		
Coefficient of Variation	0.184		
Skewness	-1.409		

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.383	Shapiro Wilk Test Statistic	0.292
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.682	95% H-UCL	0.726
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.813
95% Adjusted-CLT UCL (Chen-1995)	0.677	97.5% Chebyshev (MVUE) UCL	0.879
95% Modified-t UCL (Johnson-1978)	0.682	99% Chebyshev (MVUE) UCL	1.009

Gamma Distribution Test

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	14.77	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0439		
MLE of Mean	0.649		
MLE of Standard Deviation	0.169		
nu star	1064		
Approximate Chi Square Value (.05)	988.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	0.682
Adjusted Chi Square Value	985.6	95% Jackknife UCL	0.682
		95% Standard Bootstrap UCL	0.681
Anderson-Darling Test Statistic	11.09	95% Bootstrap-t UCL	0.677
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.683
Kolmogorov-Smirnov Test Statistic	0.496	95% Percentile Bootstrap UCL	0.68
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	0.676
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.736
		97.5% Chebyshev(Mean, Sd) UCL	0.773
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.847
95% Approximate Gamma UCL	0.698		
95% Adjusted Gamma UCL	0.7		

Potential UCL to Use

Use 95% Student's-t UCL	0.682
or 95% Modified-t UCL	0.682

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	-0.0145	Log Statistics Not Available	
Maximum	8.65		
Mean	2.661		
Median	2.576		
SD	1.115		
Coefficient of Variation	0.419		
Skewness	4.263		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.306	Not Available	
Shapiro Wilk Critical Value	0.935		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Student's-t UCL	2.975	Assuming Lognormal Distribution	
		95% H-UCL	N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.975	95% Adjusted-CLT UCL (Chen 1995)	3.107
		95% Modified-t UCL (Johnson-1978)	2.997

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	3.471	95% CLT UCL	2.966
		95% Jackknife UCL	2.975
		95% Standard Bootstrap UCL	2.961
		95% Bootstrap-t UCL	4.112
		95% Hall's Bootstrap UCL	5.93
		95% Percentile Bootstrap UCL	2.998
		95% BCA Bootstrap UCL	3.07
		95% Chebyshev(Mean, Sd) UCL	3.471
		97.5% Chebyshev(Mean, Sd) UCL	3.822
		99% Chebyshev(Mean, Sd) UCL	4.51

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.22	Minimum of Log Data	-1.514
Maximum	66.62	Maximum of Log Data	4.199
Mean	31.24	Mean of log Data	3.315
Median	31.77	SD of log Data	0.847
SD	8.455		
Coefficient of Variation	0.271		
Skewness	0.501		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.265
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	33.62	95% H-UCL	54.14
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	65.73
95% Adjusted-CLT UCL (Chen-1995)	33.68	97.5% Chebyshev (MVUE) UCL	77.34
95% Modified-t UCL (Johnson-1978)	33.64	99% Chebyshev (MVUE) UCL	100.2

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.777	Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.271		
MLE of Mean	31.24		
MLE of Standard Deviation	16.07		
nu star	271.9		
Approximate Chi Square Value (.05)	234.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	33.56
Adjusted Chi Square Value	233.2	95% Jackknife UCL	33.62
		95% Standard Bootstrap UCL	33.6
Anderson-Darling Test Statistic	10.84	95% Bootstrap-t UCL	33.54
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	34.68
Kolmogorov-Smirnov Test Statistic	0.468	95% Percentile Bootstrap UCL	33.59
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	33.71
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	37.38
		97.5% Chebyshev(Mean, Sd) UCL	40.04
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	45.26
95% Approximate Gamma UCL	36.19		
95% Adjusted Gamma UCL	36.43		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 37.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	0.9	Maximum of Log Data	-0.105
Mean	0.347	Mean of log Data	-1.105
Median	0.352	SD of log Data	0.315
SD	0.113		
Coefficient of Variation	0.325		
Skewness	3.004		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.45	Shapiro Wilk Test Statistic	0.527
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.378	95% H-UCL	0.383
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.429
95% Adjusted-CLT UCL (Chen-1995)	0.388	97.5% Chebyshev (MVUE) UCL	0.464
95% Modified-t UCL (Johnson-1978)	0.38	99% Chebyshev (MVUE) UCL	0.532

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	10.26	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0338		
MLE of Mean	0.347		
MLE of Standard Deviation	0.108		
nu star	738.5		
Approximate Chi Square Value (.05)	676.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	0.378
Adjusted Chi Square Value	673.8	95% Jackknife UCL	0.378
		95% Standard Bootstrap UCL	0.377
Anderson-Darling Test Statistic	8.854	95% Bootstrap-t UCL	0.387
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	0.544
Kolmogorov-Smirnov Test Statistic	0.45	95% Percentile Bootstrap UCL	0.38
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	0.388
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.429
		97.5% Chebyshev(Mean, Sd) UCL	0.464
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.534
95% Approximate Gamma UCL	0.378		
95% Adjusted Gamma UCL	0.38		

Potential UCL to Use

Use 95% Student's-t UCL	0.378
or 95% Modified-t UCL	0.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.37	Minimum of Log Data	-0.994
Maximum	4.7	Maximum of Log Data	1.548
Mean	1.435	Mean of log Data	0.29
Median	1.417	SD of log Data	0.396
SD	0.626		
Coefficient of Variation	0.436		
Skewness	3.938		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.397	Shapiro Wilk Test Statistic	0.497
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.611	95% H-UCL	1.634
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.869
95% Adjusted-CLT UCL (Chen-1995)	1.68	97.5% Chebyshev (MVUE) UCL	2.054
95% Modified-t UCL (Johnson-1978)	1.623	99% Chebyshev (MVUE) UCL	2.417

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	6.564	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.219		
MLE of Mean	1.435		
MLE of Standard Deviation	0.56		
nu star	472.6		
Approximate Chi Square Value (.05)	423.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	1.607
Adjusted Chi Square Value	421.1	95% Jackknife UCL	1.611
		95% Standard Bootstrap UCL	1.608
Anderson-Darling Test Statistic	9.277	95% Bootstrap-t UCL	1.696
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	2.438
Kolmogorov-Smirnov Test Statistic	0.453	95% Percentile Bootstrap UCL	1.611
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	1.706
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.89
		97.5% Chebyshev(Mean, Sd) UCL	2.086
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.473
95% Approximate Gamma UCL	1.603		
95% Adjusted Gamma UCL	1.611		

Potential UCL to Use

Use 95% Student's-t UCL 1.611
or 95% Modified-t UCL 1.623

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	5
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.06	Minimum of Log Data	-2.813
Maximum	0.56	Maximum of Log Data	-0.58
Mean	0.407	Mean of log Data	-0.932
Median	0.411	SD of log Data	0.33
SD	0.068		
Coefficient of Variation	0.167		
Skewness	-3.518		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.395	Shapiro Wilk Test Statistic	0.274
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.426	95% H-UCL	0.46
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.517
95% Adjusted-CLT UCL (Chen-1995)	0.418	97.5% Chebyshev (MVUE) UCL	0.561
95% Modified-t UCL (Johnson-1978)	0.425	99% Chebyshev (MVUE) UCL	0.648

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	14.31	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0284		
MLE of Mean	0.407		
MLE of Standard Deviation	0.108		
nu star	1030		
Approximate Chi Square Value (.05)	956.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	0.425
Adjusted Chi Square Value	953.5	95% Jackknife UCL	0.426
		95% Standard Bootstrap UCL	0.425
Anderson-Darling Test Statistic	10.67	95% Bootstrap-t UCL	0.421
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.421
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	0.424
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	0.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.456
		97.5% Chebyshev(Mean, Sd) UCL	0.478
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.52
95% Approximate Gamma UCL	0.438		
95% Adjusted Gamma UCL	0.44		

Potential UCL to Use

Use 95% Student's-t UCL	0.426
or 95% Modified-t UCL	0.425

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.44	Minimum of Log Data	-0.821
Maximum	39.2	Maximum of Log Data	3.669
Mean	30.76	Mean of log Data	3.334
Median	31.25	SD of log Data	0.714
SD	5.405		
Coefficient of Variation	0.176		
Skewness	-5.209		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.302	Shapiro Wilk Test Statistic	0.199
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	32.28	95% H-UCL	46.56
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	56.15
95% Adjusted-CLT UCL (Chen-1995)	31.41	97.5% Chebyshev (MVUE) UCL	64.92
95% Modified-t UCL (Johnson-1978)	32.15	99% Chebyshev (MVUE) UCL	82.16

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.152	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.97		
MLE of Mean	30.76		
MLE of Standard Deviation	13.55		
nu star	371		
Approximate Chi Square Value (.05)	327.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	32.24
Adjusted Chi Square Value	325.5	95% Jackknife UCL	32.28
		95% Standard Bootstrap UCL	32.26
Anderson-Darling Test Statistic	12.37	95% Bootstrap-t UCL	31.82
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	31.71
Kolmogorov-Smirnov Test Statistic	0.519	95% Percentile Bootstrap UCL	31.94
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	31.72
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	34.69
		97.5% Chebyshev(Mean, Sd) UCL	36.38
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	39.72
95% Approximate Gamma UCL	34.86		
95% Adjusted Gamma UCL	35.06		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 34.69

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	36	Number of Distinct Observations	18
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.1	Minimum of Log Data	-2.303
Maximum	51	Maximum of Log Data	3.932
Mean	3.772	Mean of log Data	0.323
Median	2	SD of log Data	1.458
SD	8.508		
Coefficient of Variation	2.256		
Skewness	5.183		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.388	Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.168	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.268
95% Adjusted-CLT UCL (Chen-1995)	7.413	95% Chebyshev (MVUE) UCL	8.885
95% Modified-t UCL (Johnson-1978)	6.372	97.5% Chebyshev (MVUE) UCL	11.1
		99% Chebyshev (MVUE) UCL	15.44

Gamma Distribution Test

k star (bias corrected)	0.58	Data Distribution	
Theta Star	6.499	Data appear Lognormal at 5% Significance Level	
MLE of Mean	3.772		
MLE of Standard Deviation	4.951		
nu star	41.79		
Approximate Chi Square Value (.05)	27.97	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	6.104
Adjusted Chi Square Value	27.46	95% Jackknife UCL	6.168
		95% Standard Bootstrap UCL	6.125
Anderson-Darling Test Statistic	1.379	95% Bootstrap-t UCL	11.87
Anderson-Darling 5% Critical Value	0.801	95% Hall's Bootstrap UCL	15.04
Kolmogorov-Smirnov Test Statistic	0.252	95% Percentile Bootstrap UCL	6.431
Kolmogorov-Smirnov 5% Critical Value	0.154	95% BCA Bootstrap UCL	8.378
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.953
		97.5% Chebyshev(Mean, Sd) UCL	12.63
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.88
95% Approximate Gamma UCL	5.635		
95% Adjusted Gamma UCL	5.741		

Potential UCL to Use		Use 95% H-UCL	8.268
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ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Plutonium-239/240

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.00963	Minimum of Log Data -4.643
Maximum	7.78	Maximum of Log Data 2.052
Mean	2.045	Mean of log Data 0.547
Median	1.964	SD of log Data 0.926
SD	1.046	
Coefficient of Variation	0.512	
Skewness	4.729	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.307	Shapiro Wilk Test Statistic 0.282
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value 0.935
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	2.339	95% H-UCL 3.804
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 4.614
95% Adjusted-CLT UCL (Chen-1995)	2.478	97.5% Chebyshev (MVUE) UCL 5.481
95% Modified-t UCL (Johnson-1978)	2.362	99% Chebyshev (MVUE) UCL 7.185

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.886	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.708	
MLE of Mean	2.045	
MLE of Standard Deviation	1.204	
nu star	207.8	
Approximate Chi Square Value (.05)	175.5	Nonparametric Statistics
Adjusted Level of Significance	0.0428	95% CLT UCL 2.331
Adjusted Chi Square Value	174.1	95% Jackknife UCL 2.339
		95% Standard Bootstrap UCL 2.342
Anderson-Darling Test Statistic	11.02	95% Bootstrap-t UCL 2.676
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL 4.072
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL 2.368
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL 2.449
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 2.805
		97.5% Chebyshev(Mean, Sd) UCL 3.134
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 3.78
95% Approximate Gamma UCL	2.422	
95% Adjusted Gamma UCL	2.44	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.805

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.22	Minimum of Log Data	-1.514
Maximum	83.3	Maximum of Log Data	4.422
Mean	22.21	Mean of log Data	2.897
Median	22.52	SD of log Data	0.914
SD	12		
Coefficient of Variation	0.541		
Skewness	3.549		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.424	Shapiro Wilk Test Statistic	0.435
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	25.59	95% H-UCL	39.17
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	47.53
95% Adjusted-CLT UCL (Chen-1995)	26.76	97.5% Chebyshev (MVUE) UCL	56.38
95% Modified-t UCL (Johnson-1978)	25.79	99% Chebyshev (MVUE) UCL	73.76

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.417	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.189		
MLE of Mean	22.21		
MLE of Standard Deviation	14.29		
nu star	174		
Approximate Chi Square Value (.05)	144.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	25.5
Adjusted Chi Square Value	143.3	95% Jackknife UCL	25.59
		95% Standard Bootstrap UCL	25.45
Anderson-Darling Test Statistic	9.19	95% Bootstrap-t UCL	26.87
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	42.02
Kolmogorov-Smirnov Test Statistic	0.48	95% Percentile Bootstrap UCL	25.65
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	27.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30.93
		97.5% Chebyshev(Mean, Sd) UCL	34.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	42.12
95% Approximate Gamma UCL	26.74		
95% Adjusted Gamma UCL	26.97		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 30.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.22	Minimum of Log Data	-1.514
Maximum	11.4	Maximum of Log Data	2.434
Mean	4.797	Mean of log Data	1.449
Median	4.746	SD of log Data	0.665
SD	1.68		
Coefficient of Variation	0.35		
Skewness	1.096		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.478	Shapiro Wilk Test Statistic	0.38
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	5.27	95% H-UCL	6.688
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.027
95% Adjusted-CLT UCL (Chen-1995)	5.312	97.5% Chebyshev (MVUE) UCL	9.218
95% Modified-t UCL (Johnson-1978)	5.278	99% Chebyshev (MVUE) UCL	11.56

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.018	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.194		
MLE of Mean	4.797		
MLE of Standard Deviation	2.393		
nu star	289.3		
Approximate Chi Square Value (.05)	250.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	5.257
Adjusted Chi Square Value	249.3	95% Jackknife UCL	5.27
		95% Standard Bootstrap UCL	5.256
Anderson-Darling Test Statistic	10.2	95% Bootstrap-t UCL	5.285
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	5.84
Kolmogorov-Smirnov Test Statistic	0.499	95% Percentile Bootstrap UCL	5.263
Kolmogorov-Smirnov 5% Critical Value	0.147	95% BCA Bootstrap UCL	5.226
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.017
		97.5% Chebyshev(Mean, Sd) UCL	6.546
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.583
95% Approximate Gamma UCL	5.531		
95% Adjusted Gamma UCL	5.567		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 6.017

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.47	Minimum of Log Data	-0.755
Maximum	20	Maximum of Log Data	2.996
Mean	6.929	Mean of log Data	1.552
Median	6.626	SD of log Data	0.997
SD	5.808		
Coefficient of Variation	0.838		
Skewness	1.446		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.712	Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	8.564	95% H-UCL	11.59
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.99
95% Adjusted-CLT UCL (Chen-1995)	8.77	97.5% Chebyshev (MVUE) UCL	16.76
95% Modified-t UCL (Johnson-1978)	8.603	99% Chebyshev (MVUE) UCL	22.19

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.344	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.154		
MLE of Mean	6.929		
MLE of Standard Deviation	5.976		
nu star	96.79		
Approximate Chi Square Value (.05)	75.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	8.521
Adjusted Chi Square Value	74.23	95% Jackknife UCL	8.564
		95% Standard Bootstrap UCL	8.534
Anderson-Darling Test Statistic	2.742	95% Bootstrap-t UCL	8.96
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	8.744
Kolmogorov-Smirnov Test Statistic	0.285	95% Percentile Bootstrap UCL	8.558
Kolmogorov-Smirnov 5% Critical Value	0.15	95% BCA Bootstrap UCL	8.718
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.15
		97.5% Chebyshev(Mean, Sd) UCL	12.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.56
95% Approximate Gamma UCL	8.931		
95% Adjusted Gamma UCL	9.035		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 6

Raw Statistics

Minimum	4	Minimum of Log Data	1.386
Maximum	268	Maximum of Log Data	5.591
Mean	74.76	Mean of log Data	4.045
Median	75.3	SD of log Data	0.964
SD	45.14		
Coefficient of Variation	0.604		
Skewness	2.361		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.552	Shapiro Wilk Test Statistic	0.538
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	87.47	95% H-UCL	133.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	161.3
95% Adjusted-CLT UCL (Chen-1995)	90.29	97.5% Chebyshev (MVUE) UCL	192.5
95% Modified-t UCL (Johnson-1978)	87.96	99% Chebyshev (MVUE) UCL	253.7

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	1.862	Data Distribution	
Theta Star	40.15	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	74.76		
MLE of Standard Deviation	54.78		
nu star	134.1		
Approximate Chi Square Value (.05)	108.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	87.13
Adjusted Chi Square Value	107.3	95% Jackknife UCL	87.47
		95% Standard Bootstrap UCL	86.66
Anderson-Darling Test Statistic	7.941	95% Bootstrap-t UCL	93
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	164.4
Kolmogorov-Smirnov Test Statistic	0.459	95% Percentile Bootstrap UCL	87.38
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	91.33
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	107.5
		97.5% Chebyshev(Mean, Sd) UCL	121.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	149.6
95% Approximate Gamma UCL	92.53		
95% Adjusted Gamma UCL	93.43		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 107.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.02	Minimum of Log Data	-3.912
Maximum	140	Maximum of Log Data	4.942
Mean	43.01	Mean of log Data	3.454
Median	43.62	SD of log Data	1.437
SD	20.01		
Coefficient of Variation	0.465		
Skewness	2.749		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.419	Shapiro Wilk Test Statistic	0.341
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	48.65	95% H-UCL	180.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	196.1
95% Adjusted-CLT UCL (Chen-1995)	50.13	97.5% Chebyshev (MVUE) UCL	244.5
95% Modified-t UCL (Johnson-1978)	48.9	99% Chebyshev (MVUE) UCL	339.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.646	Data do not follow a Discernable Distribution (0.05)	
Theta Star	26.13		
MLE of Mean	43.01		
MLE of Standard Deviation	33.52		
nu star	118.5		
Approximate Chi Square Value (.05)	94.41	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	48.5
Adjusted Chi Square Value	93.43	95% Jackknife UCL	48.65
		95% Standard Bootstrap UCL	48.48
Anderson-Darling Test Statistic	10.64	95% Bootstrap-t UCL	49.96
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	79.36
Kolmogorov-Smirnov Test Statistic	0.523	95% Percentile Bootstrap UCL	48.97
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	50.44
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	57.55
		97.5% Chebyshev(Mean, Sd) UCL	63.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	76.2
95% Approximate Gamma UCL	54.01		
95% Adjusted Gamma UCL	54.58		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 57.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.01	Minimum of Log Data	-4.605
Maximum	4.7	Maximum of Log Data	1.548
Mean	1.567	Mean of log Data	0.249
Median	1.589	SD of log Data	0.999
SD	0.657		
Coefficient of Variation	0.419		
Skewness	2.473		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.424	Shapiro Wilk Test Statistic	0.356
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.752	95% H-UCL	3.159
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.814
95% Adjusted-CLT UCL (Chen-1995)	1.796	97.5% Chebyshev (MVUE) UCL	4.568
95% Modified-t UCL (Johnson-1978)	1.76	99% Chebyshev (MVUE) UCL	6.05

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.441	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.642		
MLE of Mean	1.567		
MLE of Standard Deviation	1.003		
nu star	175.8		
Approximate Chi Square Value (.05)	146.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	1.748
Adjusted Chi Square Value	144.9	95% Jackknife UCL	1.752
		95% Standard Bootstrap UCL	1.748
Anderson-Darling Test Statistic	10.5	95% Bootstrap-t UCL	1.784
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	2.76
Kolmogorov-Smirnov Test Statistic	0.507	95% Percentile Bootstrap UCL	1.762
Kolmogorov-Smirnov 5% Critical Value	0.148	95% BCA Bootstrap UCL	1.804
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.045
		97.5% Chebyshev(Mean, Sd) UCL	2.251
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.657
95% Approximate Gamma UCL	1.886		
95% Adjusted Gamma UCL	1.902		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.045

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 36 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	150	Maximum of Log Data	5.011
Mean	48.77	Mean of log Data	3.622
Median	49.46	SD of log Data	1.333
SD	21.09		
Coefficient of Variation	0.432		
Skewness	2.587		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.423	Shapiro Wilk Test Statistic	0.323
Shapiro Wilk Critical Value	0.935	Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	54.71	95% H-UCL	170.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	192.2
95% Adjusted-CLT UCL (Chen-1995)	56.17	97.5% Chebyshev (MVUE) UCL	237.7
95% Modified-t UCL (Johnson-1978)	54.96	99% Chebyshev (MVUE) UCL	327

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.888	Data do not follow a Discernable Distribution (0.05)	
Theta Star	25.84		
MLE of Mean	48.77		
MLE of Standard Deviation	35.5		
nu star	135.9		

Approximate Chi Square Value (.05)

		110 Nonparametric Statistics	
Adjusted Level of Significance	0.0428	95% CLT UCL	54.55
Adjusted Chi Square Value	108.9	95% Jackknife UCL	54.71
		95% Standard Bootstrap UCL	54.59
Anderson-Darling Test Statistic	10.58	95% Bootstrap-t UCL	55.89
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	87.35
Kolmogorov-Smirnov Test Statistic	0.517	95% Percentile Bootstrap UCL	54.84
Kolmogorov-Smirnov 5% Critical Value	0.149	95% BCA Bootstrap UCL	57.02
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	64.09
		97.5% Chebyshev(Mean, Sd) UCL	70.72
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	83.73
95% Approximate Gamma UCL	60.27		
95% Adjusted Gamma UCL	60.86		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 64.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	158-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	24	Number of Distinct Observations	8
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Raw Statistics

Minimum	0.25	Log-transformed Statistics	
Maximum	0.7	Minimum of Log Data	-1.386
Mean	0.46	Maximum of Log Data	-0.357
Median	0.46	Mean of log Data	-0.794
SD	0.0849	SD of log Data	0.201
Coefficient of Variation	0.184		
Skewness	-0.0886		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.757	Shapiro Wilk Test Statistic	0.726
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.49	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.497
95% Adjusted-CLT UCL (Chen-1995)	0.489	95% Chebyshev (MVUE) UCL	0.544
95% Modified-t UCL (Johnson-1978)	0.49	97.5% Chebyshev (MVUE) UCL	0.58
		99% Chebyshev (MVUE) UCL	0.651

Gamma Distribution Test

k star (bias corrected)	24.38	Data Distribution	
Theta Star	0.0189	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.46		
MLE of Standard Deviation	0.0932		
nu star	1170		
Approximate Chi Square Value (.05)	1092	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	0.489
Adjusted Chi Square Value	1086	95% Jackknife UCL	0.49
		95% Standard Bootstrap UCL	0.489
Anderson-Darling Test Statistic	3.278	95% Bootstrap-t UCL	0.49
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.494
Kolmogorov-Smirnov Test Statistic	0.4	95% Percentile Bootstrap UCL	0.487
Kolmogorov-Smirnov 5% Critical Value	0.177	95% BCA Bootstrap UCL	0.487
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.536
		97.5% Chebyshev(Mean, Sd) UCL	0.569
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.633
95% Approximate Gamma UCL	0.493		
95% Adjusted Gamma UCL	0.496		

Potential UCL to Use

Use 95% Student's-t UCL	0.49
or 95% Modified-t UCL	0.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	3.33	Minimum of Log Data	1.203
Maximum	12.83	Maximum of Log Data	2.552
Mean	8.756	Mean of log Data	2.135
Median	8.756	SD of log Data	0.288
SD	2.166		
Coefficient of Variation	0.247		
Skewness	-0.327		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Test Statistic	0.845
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.514	95% H-UCL	9.831
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.09
95% Adjusted-CLT UCL (Chen-1995)	9.452	97.5% Chebyshev (MVUE) UCL	12.08
95% Modified-t UCL (Johnson-1978)	9.509	99% Chebyshev (MVUE) UCL	14.02

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	12.57	Data appear Normal at 5% Significance Level	
Theta Star	0.697		
MLE of Mean	8.756		
MLE of Standard Deviation	2.47		
nu star	603.4		
Approximate Chi Square Value (.05)	547.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	9.484
Adjusted Chi Square Value	543.7	95% Jackknife UCL	9.514
		95% Standard Bootstrap UCL	9.476
Anderson-Darling Test Statistic	1.262	95% Bootstrap-t UCL	9.488
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	9.508
Kolmogorov-Smirnov Test Statistic	0.243	95% Percentile Bootstrap UCL	9.42
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	9.413
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.68
		97.5% Chebyshev(Mean, Sd) UCL	11.52
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.16
95% Approximate Gamma UCL	9.652		
95% Adjusted Gamma UCL	9.718		

Potential UCL to Use Use 95% Student's-t UCL 9.514

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	30.6 Minimum of Log Data	3.421
Maximum	292 Maximum of Log Data	5.677
Mean	146.8 Mean of log Data	4.921
Median	146.8 SD of log Data	0.417
SD	49.95	
Coefficient of Variation	0.34	
Skewness	0.842	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.694 Shapiro Wilk Test Statistic	0.647
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	164.3 95% H-UCL	176.8
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	206
95% Adjusted-CLT UCL (Chen-1995)	165.5 97.5% Chebyshev (MVUE) UCL	230.7
95% Modified-t UCL (Johnson-1978)	164.6 99% Chebyshev (MVUE) UCL	279.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.625 Data do not follow a Discernable Distribution (0.05)	
Theta Star	22.16	
MLE of Mean	146.8	
MLE of Standard Deviation	57.04	
nu star	318	
Approximate Chi Square Value (.05)	277.7 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	163.6
Adjusted Chi Square Value	275 95% Jackknife UCL	164.3
	95% Standard Bootstrap UCL	163.5
Anderson-Darling Test Statistic	3.865 95% Bootstrap-t UCL	166.9
Anderson-Darling 5% Critical Value	0.745 95% Hall's Bootstrap UCL	180.9
Kolmogorov-Smirnov Test Statistic	0.382 95% Percentile Bootstrap UCL	163.3
Kolmogorov-Smirnov 5% Critical Value	0.178 95% BCA Bootstrap UCL	163.9
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	191.3
	97.5% Chebyshev(Mean, Sd) UCL	210.5
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	248.3
95% Approximate Gamma UCL	168.1	
95% Adjusted Gamma UCL	169.8	

Potential UCL to Use

Use 95% Student's-t UCL 164.3
 or 95% Modified-t UCL 164.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	0.33	Minimum of Log Data	-1.109
Maximum	0.75	Maximum of Log Data	-0.288
Mean	0.545	Mean of log Data	-0.616
Median	0.545	SD of log Data	0.136
SD	0.0693		
Coefficient of Variation	0.127		
Skewness	-0.144		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.713	Shapiro Wilk Test Statistic	0.678
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.569	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.573
95% Adjusted-CLT UCL (Chen-1995)	0.567	95% Chebyshev (MVUE) UCL	0.611
95% Modified-t UCL (Johnson-1978)	0.569	97.5% Chebyshev (MVUE) UCL	0.64
		99% Chebyshev (MVUE) UCL	0.696

Gamma Distribution Test

k star (bias corrected)	52.22	Data Distribution	
Theta Star	0.0104	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.545		
MLE of Standard Deviation	0.0754		
nu star	2507		
Approximate Chi Square Value (.05)	2391	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	0.568
Adjusted Chi Square Value	2383	95% Jackknife UCL	0.569
		95% Standard Bootstrap UCL	0.567
Anderson-Darling Test Statistic	3.453	95% Bootstrap-t UCL	0.567
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.574
Kolmogorov-Smirnov Test Statistic	0.351	95% Percentile Bootstrap UCL	0.567
Kolmogorov-Smirnov 5% Critical Value	0.177	95% BCA Bootstrap UCL	0.567
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.606
		97.5% Chebyshev(Mean, Sd) UCL	0.633
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.685
95% Approximate Gamma UCL	0.571		
95% Adjusted Gamma UCL	0.573		

Potential UCL to Use

Use 95% Student's-t UCL	0.569
or 95% Modified-t UCL	0.569

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	22.1	Minimum of Log Data	3.096
Maximum	85	Maximum of Log Data	4.443
Mean	46.77	Mean of log Data	3.813
Median	46.77	SD of log Data	0.261
SD	12.51		
Coefficient of Variation	0.267		
Skewness	1.267		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	51.14	95% H-UCL	51.66
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	57.75
95% Adjusted-CLT UCL (Chen-1995)	51.67	97.5% Chebyshev (MVUE) UCL	62.5
95% Modified-t UCL (Johnson-1978)	51.25	99% Chebyshev (MVUE) UCL	71.82

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	13.69	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.417		
MLE of Mean	46.77		
MLE of Standard Deviation	12.64		
nu star	657		
Approximate Chi Square Value (.05)	598.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	50.97
Adjusted Chi Square Value	594.6	95% Jackknife UCL	51.14
		95% Standard Bootstrap UCL	50.88
Anderson-Darling Test Statistic	1.474	95% Bootstrap-t UCL	52.23
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	55.08
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL	51.04
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	51.87
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	57.9
		97.5% Chebyshev(Mean, Sd) UCL	62.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	72.17
95% Approximate Gamma UCL	51.34		
95% Adjusted Gamma UCL	51.68		

Potential UCL to Use

Use 95% Student's-t UCL	51.14
or 95% Modified-t UCL	51.25

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	3.1 Minimum of Log Data	1.131
Maximum	36.5 Maximum of Log Data	3.597
Mean	10.49 Mean of log Data	2.258
Median	10.49 SD of log Data	0.413
SD	5.913	
Coefficient of Variation	0.564	
Skewness	3.878	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.466 Shapiro Wilk Test Statistic	0.684
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	12.55 95% H-UCL	12.27
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	14.29
95% Adjusted-CLT UCL (Chen-1995)	13.49 97.5% Chebyshev (MVUE) UCL	15.98
95% Modified-t UCL (Johnson-1978)	12.71 99% Chebyshev (MVUE) UCL	19.31

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.93 Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.127	
MLE of Mean	10.49	
MLE of Standard Deviation	4.722	
nu star	236.6	

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0392	Nonparametric Statistics	
Adjusted Chi Square Value	199.8	95% CLT UCL	12.47
		95% Jackknife UCL	12.55
		95% Standard Bootstrap UCL	12.42
Anderson-Darling Test Statistic	3.766	95% Bootstrap-t UCL	14.49
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	21.26
Kolmogorov-Smirnov Test Statistic	0.402	95% Percentile Bootstrap UCL	12.67
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	14.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.75
		97.5% Chebyshev(Mean, Sd) UCL	18.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	22.49
95% Approximate Gamma UCL	12.28		
95% Adjusted Gamma UCL	12.42		

Potential UCL to Use

Use 95% Student's-t UCL	12.55
or 95% Modified-t UCL	12.71

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	36.4	Minimum of Log Data	3.595
Maximum	1860	Maximum of Log Data	7.528
Mean	720.3	Mean of log Data	6.361
Median	720.3	SD of log Data	0.86
SD	363.7		
Coefficient of Variation	0.505		
Skewness	0.811		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Test Statistic	0.691
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	847.6	95% H-UCL	1280
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1516
95% Adjusted-CLT UCL (Chen-1995)	855.6	97.5% Chebyshev (MVUE) UCL	1816
95% Modified-t UCL (Johnson-1978)	849.6	99% Chebyshev (MVUE) UCL	2407

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.163	Data do not follow a Discernable Distribution (0.05)	
Theta Star	333		
MLE of Mean	720.3		
MLE of Standard Deviation	489.8		
nu star	103.8		
Approximate Chi Square Value (.05)	81.31	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	842.4
Adjusted Chi Square Value	79.91	95% Jackknife UCL	847.6
		95% Standard Bootstrap UCL	840.4
Anderson-Darling Test Statistic	2.505	95% Bootstrap-t UCL	858.6
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	898
Kolmogorov-Smirnov Test Statistic	0.293	95% Percentile Bootstrap UCL	846
Kolmogorov-Smirnov 5% Critical Value	0.18	95% BCA Bootstrap UCL	853.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1044
		97.5% Chebyshev(Mean, Sd) UCL	1184
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1459
95% Approximate Gamma UCL	919.8		
95% Adjusted Gamma UCL	935.9		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1044

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0078	Minimum of Log Data	-4.854
Maximum	10.46	Maximum of Log Data	2.348
Mean	4.156	Mean of log Data	-0.0532
Median	4.156	SD of log Data	2.649
SD	3.749		
Coefficient of Variation	0.902		
Skewness	0.472		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.824	Shapiro Wilk Test Statistic	0.749
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.468	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	562
95% Adjusted-CLT UCL (Chen-1995)	5.494	95% Chebyshev (MVUE) UCL	78.15
95% Modified-t UCL (Johnson-1978)	5.48	97.5% Chebyshev (MVUE) UCL	103.6
		99% Chebyshev (MVUE) UCL	153.6

Gamma Distribution Test

k star (bias corrected)	0.412	Data Distribution	
Theta Star	10.1	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.156		
MLE of Standard Deviation	6.478		
nu star	19.76		
Approximate Chi Square Value (.05)	10.68	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	5.415
Adjusted Chi Square Value	10.21	95% Jackknife UCL	5.468
		95% Standard Bootstrap UCL	5.377
Anderson-Darling Test Statistic	2.544	95% Bootstrap-t UCL	5.529
Anderson-Darling 5% Critical Value	0.82	95% Hall's Bootstrap UCL	5.511
Kolmogorov-Smirnov Test Statistic	0.36	95% Percentile Bootstrap UCL	5.368
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	5.456
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	7.492
		97.5% Chebyshev(Mean, Sd) UCL	8.935
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.77
95% Approximate Gamma UCL	7.694		
95% Adjusted Gamma UCL	8.047		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 11.77
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 5

Raw Statistics

Minimum
Maximum 0.089
Mean 0.0443
Median 0.0443
SD 0.0172
Coefficient of Variation 0.389
Skewness 0.00604

Log-transformed Statistics

0 Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.59 Not Available
Shapiro Wilk Critical Value 0.916

Lognormal Distribution Test

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.0503
Assuming Normal Distribution
95% Student's-t UCL 0.0503

Assuming Lognormal Distribution

95% H-UCL N/A
95% UCLs (Adjusted for Skewness)
95% Adjusted-CLT UCL (Chen 199 0.0501
95% Modified-t UCL (Johnson-197 0.0503

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.0596
95% CLT UCL 0.0501
95% Jackknife UCL 0.0503
95% Standard Bootstrap UCL 0.0501
95% Bootstrap-t UCL 0.0504
95% Hall's Bootstrap UCL 0.0521
95% Percentile Bootstrap UCL 0.0496
95% BCA Bootstrap UCL 0.0496
95% Chebyshev(Mean, Sd) UCL 0.0596
97.5% Chebyshev(Mean, Sd) UCL 0.0663
99% Chebyshev(Mean, Sd) UCL 0.0793

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	4.2 Minimum of Log Data	1.435
Maximum	131.9 Maximum of Log Data	4.882
Mean	55.33 Mean of log Data	3.767
Median	55.33 SD of log Data	0.887
SD	29.09	
Coefficient of Variation	0.526	
Skewness	0.188	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.883 Shapiro Wilk Test Statistic	0.735
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	65.51 95% H-UCL	99.82
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	117.6
95% Adjusted-CLT UCL (Chen-1995)	65.34 97.5% Chebyshev (MVUE) UCL	141.4
95% Modified-t UCL (Johnson-1978)	65.54 99% Chebyshev (MVUE) UCL	188.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.937 Data do not follow a Discernable Distribution (0.05)	
Theta Star	28.57	
MLE of Mean	55.33	
MLE of Standard Deviation	39.76	
nu star	92.96	
Approximate Chi Square Value (.05)	71.72 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	65.1
Adjusted Chi Square Value	70.41 95% Jackknife UCL	65.51
	95% Standard Bootstrap UCL	64.62
Anderson-Darling Test Statistic	2.366 95% Bootstrap-t UCL	65.79
Anderson-Darling 5% Critical Value	0.754 95% Hall's Bootstrap UCL	66.31
Kolmogorov-Smirnov Test Statistic	0.382 95% Percentile Bootstrap UCL	64.74
Kolmogorov-Smirnov 5% Critical Value	0.18 95% BCA Bootstrap UCL	65.56
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	81.21
	97.5% Chebyshev(Mean, Sd) UCL	92.41
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	114.4
95% Approximate Gamma UCL	71.71	
95% Adjusted Gamma UCL	73.05	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 81.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.029	Minimum of Log Data	-3.54
Maximum	14.7	Maximum of Log Data	2.688
Mean	4.712	Mean of log Data	0.458
Median	4.712	SD of log Data	2.143
SD	4.199		
Coefficient of Variation	0.891		
Skewness	0.627		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.852	Shapiro Wilk Test Statistic	0.779
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	6.181	95% H-UCL	108.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	42.1
95% Adjusted-CLT UCL (Chen-1995)	6.239	97.5% Chebyshev (MVUE) UCL	55.05
95% Modified-t UCL (Johnson-1978)	6.199	99% Chebyshev (MVUE) UCL	80.5

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.526	Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.95		
MLE of Mean	4.712		
MLE of Standard Deviation	6.494		
nu star	25.27		
Approximate Chi Square Value (.05)	14.82	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	6.122
Adjusted Chi Square Value	14.26	95% Jackknife UCL	6.181
		95% Standard Bootstrap UCL	6.105
Anderson-Darling Test Statistic	1.958	95% Bootstrap-t UCL	6.48
Anderson-Darling 5% Critical Value	0.8	95% Hall's Bootstrap UCL	6.245
Kolmogorov-Smirnov Test Statistic	0.339	95% Percentile Bootstrap UCL	6.097
Kolmogorov-Smirnov 5% Critical Value	0.187	95% BCA Bootstrap UCL	6.182
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.448
		97.5% Chebyshev(Mean, Sd) UCL	10.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.24
95% Approximate Gamma UCL	8.035		
95% Adjusted Gamma UCL	8.352		

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UC 10.07

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.17	Minimum of Log Data	-1.772
Maximum	0.534	Maximum of Log Data	-0.627
Mean	0.341	Mean of log Data	-1.105
Median	0.341	SD of log Data	0.255
SD	0.0808		
Coefficient of Variation	0.237		
Skewness	0.383		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.745	Shapiro Wilk Test Statistic	0.73
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.369	95% H-UCL	0.376
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.42
95% Adjusted-CLT UCL (Chen-1995)	0.37	97.5% Chebyshev (MVUE) UCL	0.454
95% Modified-t UCL (Johnson-1978)	0.369	99% Chebyshev (MVUE) UCL	0.52

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	15.23	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0224		
MLE of Mean	0.341		
MLE of Standard Deviation	0.0874		
nu star	731.1		
Approximate Chi Square Value (.05)	669.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	0.368
Adjusted Chi Square Value	665.2	95% Jackknife UCL	0.369
		95% Standard Bootstrap UCL	0.367
Anderson-Darling Test Statistic	3.287	95% Bootstrap-t UCL	0.371
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	0.381
Kolmogorov-Smirnov Test Statistic	0.365	95% Percentile Bootstrap UCL	0.369
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	0.367
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.413
		97.5% Chebyshev(Mean, Sd) UCL	0.444
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.505
95% Approximate Gamma UCL	0.372		
95% Adjusted Gamma UCL	0.375		

Potential UCL to Use

Use 95% Student's-t UCL	0.369
or 95% Modified-t UCL	0.369

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	0.0072 Minimum of Log Data	-4.934
Maximum	2.3 Maximum of Log Data	0.833
Mean	0.605 Mean of log Data	-0.758
Median	0.605 SD of log Data	1.016
SD	0.396	
Coefficient of Variation	0.655	
Skewness	3.421	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.483 Shapiro Wilk Test Statistic	0.496
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.744 95% H-UCL	1.352
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.544
95% Adjusted-CLT UCL (Chen-1995)	0.799 97.5% Chebyshev (MVUE) UCL	1.883
95% Modified-t UCL (Johnson-1978)	0.753 99% Chebyshev (MVUE) UCL	2.548

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.872 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.323	
MLE of Mean	0.605	
MLE of Standard Deviation	0.442	
nu star	89.86	

Approximate Chi Square Value (.05)

	69 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	0.738
Adjusted Chi Square Value	67.72 95% Jackknife UCL	0.744
	95% Standard Bootstrap UCL	0.735
Anderson-Darling Test Statistic	4.834 95% Bootstrap-t UCL	0.83
Anderson-Darling 5% Critical Value	0.755 95% Hall's Bootstrap UCL	1.37
Kolmogorov-Smirnov Test Statistic	0.383 95% Percentile Bootstrap UCL	0.738
Kolmogorov-Smirnov 5% Critical Value	0.18 95% BCA Bootstrap UCL	0.806
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.958
	97.5% Chebyshev(Mean, Sd) UCL	1.111
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.41
95% Approximate Gamma UCL	0.788	
95% Adjusted Gamma UCL	0.803	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.958

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	2.9	Minimum of Log Data	1.065
Maximum	30.24	Maximum of Log Data	3.409
Mean	15.52	Mean of log Data	2.652
Median	15.52	SD of log Data	0.506
SD	5.365		
Coefficient of Variation	0.346		
Skewness	-0.128		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.835	Shapiro Wilk Test Statistic	0.676
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	17.4	95% H-UCL	19.88
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23.54
95% Adjusted-CLT UCL (Chen-1995)	17.29	97.5% Chebyshev (MVUE) UCL	26.79
95% Modified-t UCL (Johnson-1978)	17.39	99% Chebyshev (MVUE) UCL	33.17

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.041	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.079		
MLE of Mean	15.52		
MLE of Standard Deviation	6.914		
nu star	242		
Approximate Chi Square Value (.05)	207	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	17.32
Adjusted Chi Square Value	204.7	95% Jackknife UCL	17.4
		95% Standard Bootstrap UCL	17.31
Anderson-Darling Test Statistic	2.704	95% Bootstrap-t UCL	17.33
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	17.57
Kolmogorov-Smirnov Test Statistic	0.347	95% Percentile Bootstrap UCL	17.32
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	17.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20.3
		97.5% Chebyshev(Mean, Sd) UCL	22.36
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26.42
95% Approximate Gamma UCL	18.15		
95% Adjusted Gamma UCL	18.35		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 20.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	0.053	Minimum of Log Data -2.937
Maximum	0.259	Maximum of Log Data -1.351
Mean	0.128	Mean of log Data -2.092
Median	0.128	SD of log Data 0.286
SD	0.0348	
Coefficient of Variation	0.272	
Skewness	1.67	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.504	Shapiro Wilk Test Statistic 0.521
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value 0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.14	95% H-UCL 0.143
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.162
95% Adjusted-CLT UCL (Chen-1995)	0.142	97.5% Chebyshev (MVUE) UCL 0.176
95% Modified-t UCL (Johnson-1978)	0.141	99% Chebyshev (MVUE) UCL 0.204

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	12.31	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0104	
MLE of Mean	0.128	
MLE of Standard Deviation	0.0365	
nu star	591.1	
Approximate Chi Square Value (.05)	535.7	Nonparametric Statistics
Adjusted Level of Significance	0.0392	95% CLT UCL 0.14
Adjusted Chi Square Value	532	95% Jackknife UCL 0.14
		95% Standard Bootstrap UCL 0.14
Anderson-Darling Test Statistic	5.875	95% Bootstrap-t UCL 0.141
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL 0.163
Kolmogorov-Smirnov Test Statistic	0.452	95% Percentile Bootstrap UCL 0.14
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL 0.142
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.159
		97.5% Chebyshev(Mean, Sd) UCL 0.172
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.199
95% Approximate Gamma UCL	0.141	
95% Adjusted Gamma UCL	0.142	

Potential UCL to Use Use 95% Student's-t UCL 0.14
or 95% Modified-t UCL 0.141

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.79	Minimum of Log Data	-0.236
Maximum	6.5	Maximum of Log Data	1.872
Mean	2.828	Mean of log Data	0.983
Median	2.828	SD of log Data	0.37
SD	0.948		
Coefficient of Variation	0.335		
Skewness	1.995		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.476	Shapiro Wilk Test Statistic	0.498
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.159	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3.307
95% Adjusted-CLT UCL (Chen-1995)	3.23	95% Chebyshev (MVUE) UCL	3.813
95% Modified-t UCL (Johnson-1978)	3.172	97.5% Chebyshev (MVUE) UCL	4.229
		99% Chebyshev (MVUE) UCL	5.046

Gamma Distribution Test

k star (bias corrected)	7.89	Data Distribution	
Theta Star	0.358	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.828		
MLE of Standard Deviation	1.007		
nu star	378.7		
Approximate Chi Square Value (.05)	334.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	3.146
Adjusted Chi Square Value	331.7	95% Jackknife UCL	3.159
		95% Standard Bootstrap UCL	3.131
Anderson-Darling Test Statistic	6.156	95% Bootstrap-t UCL	3.222
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	5.002
Kolmogorov-Smirnov Test Statistic	0.461	95% Percentile Bootstrap UCL	3.202
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	3.218
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.671
		97.5% Chebyshev(Mean, Sd) UCL	4.036
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.753
95% Approximate Gamma UCL	3.2		
95% Adjusted Gamma UCL	3.228		

Potential UCL to Use

Use 95% Student's-t UCL	3.159
or 95% Modified-t UCL	3.172

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	158-01.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Antimony			
General Statistics			
Number of Valid Observations	24	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	0.7	Maximum of Log Data	-0.357
Mean	0.493	Mean of log Data	-0.733
Median	0.493	SD of log Data	0.261
SD	0.0863		
Coefficient of Variation	0.175		
Skewness	-2.234		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.481	Shapiro Wilk Test Statistic	0.377
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.523	95% H-UCL	0.548
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.613
95% Adjusted-CLT UCL (Chen-1995)	0.513	97.5% Chebyshev (MVUE) UCL	0.663
95% Modified-t UCL (Johnson-1978)	0.521	99% Chebyshev (MVUE) UCL	0.762
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	18.17	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0271		
MLE of Mean	0.493		
MLE of Standard Deviation	0.116		
nu star	872.4		
Approximate Chi Square Value (.05)	804.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	0.521
Adjusted Chi Square Value	800.3	95% Jackknife UCL	0.523
		95% Standard Bootstrap UCL	0.521
Anderson-Darling Test Statistic	6.27	95% Bootstrap-t UCL	0.516
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.517
Kolmogorov-Smirnov Test Statistic	0.488	95% Percentile Bootstrap UCL	0.518
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	0.515
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.569
		97.5% Chebyshev(Mean, Sd) UCL	0.603
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.668
95% Approximate Gamma UCL	0.534		
95% Adjusted Gamma UCL	0.537		
Potential UCL to Use		Use 95% Student's-t UCL	0.523
		or 95% Modified-t UCL	0.521

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	6.8 Minimum of Log Data	1.917
Maximum	12.83 Maximum of Log Data	2.552
Mean	9.613 Mean of log Data	2.252
Median	9.613 SD of log Data	0.153
SD	1.44	
Coefficient of Variation	0.15	
Skewness	0.155	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.895 Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.12	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.17
95% Adjusted-CLT UCL (Chen-1995)	10.11	95% Chebyshev (MVUE) UCL	10.93
95% Modified-t UCL (Johnson-1978)	10.12	97.5% Chebyshev (MVUE) UCL	11.5
		99% Chebyshev (MVUE) UCL	12.61

Gamma Distribution Test

k star (bias corrected)	39.98	Data Distribution	
Theta Star	0.24	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.613		
MLE of Standard Deviation	1.52		
nu star	1919		
Approximate Chi Square Value (.05)	1819	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	10.1
Adjusted Chi Square Value	1812	95% Jackknife UCL	10.12
		95% Standard Bootstrap UCL	10.09
Anderson-Darling Test Statistic	1.417	95% Bootstrap-t UCL	10.14
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	10.16
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	10.1
Kolmogorov-Smirnov 5% Critical Value	0.177	95% BCA Bootstrap UCL	10.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.89
		97.5% Chebyshev(Mean, Sd) UCL	11.45
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.54
95% Approximate Gamma UCL	10.15		
95% Adjusted Gamma UCL	10.18		

Potential UCL to Use

Use 95% Student's-t UCL 10.12
 or 95% Modified-t UCL 10.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	129	Minimum of Log Data	4.86
Maximum	292	Maximum of Log Data	5.677
Mean	208.8	Mean of log Data	5.332
Median	208.8	SD of log Data	0.144
SD	28.52		
Coefficient of Variation	0.137		
Skewness	0.0846		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.595	Shapiro Wilk Test Statistic	0.58
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	218.7	95% H-UCL	220.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	235.7
95% Adjusted-CLT UCL (Chen-1995)	218.4	97.5% Chebyshev (MVUE) UCL	247.3
95% Modified-t UCL (Johnson-1978)	218.7	99% Chebyshev (MVUE) UCL	270.2

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	46.28	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.511		
MLE of Mean	208.8		
MLE of Standard Deviation	30.69		
nu star	2221		
Approximate Chi Square Value (.05)	2113	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	218.3
Adjusted Chi Square Value	2106	95% Jackknife UCL	218.7
		95% Standard Bootstrap UCL	218.2
Anderson-Darling Test Statistic	5.283	95% Bootstrap-t UCL	219.1
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	220.9
Kolmogorov-Smirnov Test Statistic	0.435	95% Percentile Bootstrap UCL	217.9
Kolmogorov-Smirnov 5% Critical Value	0.177	95% BCA Bootstrap UCL	217.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	234.1
		97.5% Chebyshev(Mean, Sd) UCL	245.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	266.7
95% Approximate Gamma UCL	219.5		
95% Adjusted Gamma UCL	220.2		

Potential UCL to Use

Use 95% Student's-t UCL 218.7
or 95% Modified-t UCL 218.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 10

Raw Statistics

	Log-transformed Statistics	
Minimum	11.9 Minimum of Log Data	2.477
Maximum	85 Maximum of Log Data	4.443
Mean	54.62 Mean of log Data	3.937
Median	54.62 SD of log Data	0.405
SD	17.5	
Coefficient of Variation	0.32	
Skewness	0.0593	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.859 Shapiro Wilk Test Statistic	0.765
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	60.74 95% H-UCL	65.31
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	75.93
95% Adjusted-CLT UCL (Chen-1995)	60.54 97.5% Chebyshev (MVUE) UCL	84.81
95% Modified-t UCL (Johnson-1978)	60.75 99% Chebyshev (MVUE) UCL	102.2

Gamma Distribution Test

k star (bias corrected)	7.025	Data Distribution	
Theta Star	7.775	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	54.62		
MLE of Standard Deviation	20.61		
nu star	337.2		
Approximate Chi Square Value (.05)	295.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	60.49
Adjusted Chi Square Value	292.9	95% Jackknife UCL	60.74
		95% Standard Bootstrap UCL	60.38
Anderson-Darling Test Statistic	1.731	95% Bootstrap-t UCL	60.96
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	61.14
Kolmogorov-Smirnov Test Statistic	0.255	95% Percentile Bootstrap UCL	60.32
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	60.24
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	70.19
		97.5% Chebyshev(Mean, Sd) UCL	76.92
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	90.16
95% Approximate Gamma UCL	62.29		
95% Adjusted Gamma UCL	62.87		

Potential UCL to Use

Use 95% Student's-t UCL 60.74
or 95% Modified-t UCL 60.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	5.9 Minimum of Log Data	1.775
Maximum	36.5 Maximum of Log Data	3.597
Mean	14.35 Mean of log Data	2.61
Median	14.35 SD of log Data	0.332
SD	5.354	
Coefficient of Variation	0.373	
Skewness	2.952	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.475 Shapiro Wilk Test Statistic	0.571
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	16.22 95% H-UCL	16.34
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	18.65
95% Adjusted-CLT UCL (Chen-1995)	16.85 97.5% Chebyshev (MVUE) UCL	20.52
95% Modified-t UCL (Johnson-1978)	16.33 99% Chebyshev (MVUE) UCL	24.19

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	8.352 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.718	
MLE of Mean	14.35	
MLE of Standard Deviation	4.965	
nu star	400.9	
Approximate Chi Square Value (.05)	355.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	16.15
Adjusted Chi Square Value	352.5 95% Jackknife UCL	16.22
	95% Standard Bootstrap UCL	16.13
Anderson-Darling Test Statistic	5.364 95% Bootstrap-t UCL	16.98
Anderson-Darling 5% Critical Value	0.745 95% Hall's Bootstrap UCL	25.2
Kolmogorov-Smirnov Test Statistic	0.418 95% Percentile Bootstrap UCL	16.32
Kolmogorov-Smirnov 5% Critical Value	0.178 95% BCA Bootstrap UCL	17.12
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	19.11
	97.5% Chebyshev(Mean, Sd) UCL	21.17
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	25.22
95% Approximate Gamma UCL	16.18	
95% Adjusted Gamma UCL	16.32	

Potential UCL to Use

Use 95% Student's-t UCL 16.22
or 95% Modified-t UCL 16.33

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	75.46	Minimum of Log Data	4.324
Maximum	1860	Maximum of Log Data	7.528
Mean	715.1	Mean of log Data	6.467
Median	715.1	SD of log Data	0.547
SD	309.7		
Coefficient of Variation	0.433		
Skewness	1.946		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.748	Shapiro Wilk Test Statistic	0.686
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	823.4	95% H-UCL	940.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1120
95% Adjusted-CLT UCL (Chen-1995)	845.9	97.5% Chebyshev (MVUE) UCL	1283
95% Modified-t UCL (Johnson-1978)	827.6	99% Chebyshev (MVUE) UCL	1605

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.306	Data do not follow a Discernable Distribution (0.05)	
Theta Star	166.1		
MLE of Mean	715.1		
MLE of Standard Deviation	344.6		
nu star	206.7		
Approximate Chi Square Value (.05)	174.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	819.1
Adjusted Chi Square Value	172.3	95% Jackknife UCL	823.4
		95% Standard Bootstrap UCL	816.4
Anderson-Darling Test Statistic	2.304	95% Bootstrap-t UCL	866.1
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	1457
Kolmogorov-Smirnov Test Statistic	0.269	95% Percentile Bootstrap UCL	820.7
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	842.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	990.6
		97.5% Chebyshev(Mean, Sd) UCL	1110
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1344
95% Approximate Gamma UCL	847.4		
95% Adjusted Gamma UCL	857.6		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 990.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 7

Raw Statistics	Log-transformed Statistics	
Minimum	0.0222 Minimum of Log Data	-3.808
Maximum	10.46 Maximum of Log Data	2.348
Mean	6.72 Mean of log Data	1.191
Median	6.72 SD of log Data	2.014
SD	3.411	
Coefficient of Variation	0.508	
Skewness	-1.065	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.761 Shapiro Wilk Test Statistic	0.544
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	7.913 95% H-UCL	140.7
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	66.82
95% Adjusted-CLT UCL (Chen-1995)	7.703 97.5% Chebyshev (MVUE) UCL	86.99
95% Modified-t UCL (Johnson-1978)	7.888 99% Chebyshev (MVUE) UCL	126.6

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.752 Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.935	
MLE of Mean	6.72	
MLE of Standard Deviation	7.749	
nu star	36.1	
Approximate Chi Square Value (.05)	23.35 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	7.865
Adjusted Chi Square Value	22.63 95% Jackknife UCL	7.913
	95% Standard Bootstrap UCL	7.861
Anderson-Darling Test Statistic	5.095 95% Bootstrap-t UCL	7.766
Anderson-Darling 5% Critical Value	0.779 95% Hall's Bootstrap UCL	7.749
Kolmogorov-Smirnov Test Statistic	0.478 95% Percentile Bootstrap UCL	7.822
Kolmogorov-Smirnov 5% Critical Value	0.184 95% BCA Bootstrap UCL	7.696
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	9.754
	97.5% Chebyshev(Mean, Sd) UCL	11.07
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	13.65
95% Approximate Gamma UCL	10.39	
95% Adjusted Gamma UCL	10.72	

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 11.07
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	13.5 Minimum of Log Data	2.603
Maximum	131.9 Maximum of Log Data	4.882
Mean	65.56 Mean of log Data	4.113
Median	65.56 SD of log Data	0.441
SD	20.76	
Coefficient of Variation	0.317	
Skewness	0.345	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.627 Shapiro Wilk Test Statistic	0.542
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	72.83 95% H-UCL	80.43
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	94.2
95% Adjusted-CLT UCL (Chen-1995)	72.85 97.5% Chebyshev (MVUE) UCL	105.9
95% Modified-t UCL (Johnson-1978)	72.88 99% Chebyshev (MVUE) UCL	129

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.434 Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.19	
MLE of Mean	65.56	
MLE of Standard Deviation	25.85	
nu star	308.8	
Approximate Chi Square Value (.05)	269.1 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	72.53
Adjusted Chi Square Value	266.5 95% Jackknife UCL	72.83
	95% Standard Bootstrap UCL	72.3
Anderson-Darling Test Statistic	5.014 95% Bootstrap-t UCL	72.54
Anderson-Darling 5% Critical Value	0.745 95% Hall's Bootstrap UCL	75.68
Kolmogorov-Smirnov Test Statistic	0.432 95% Percentile Bootstrap UCL	72.49
Kolmogorov-Smirnov 5% Critical Value	0.178 95% BCA Bootstrap UCL	72.86
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	84.04
	97.5% Chebyshev(Mean, Sd) UCL	92.03
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	107.7
95% Approximate Gamma UCL	75.24	
95% Adjusted Gamma UCL	75.97	

Potential UCL to Use

Use 95% Student's-t UCL 72.83
 or 95% Modified-t UCL 72.88

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.18	Minimum of Log Data	-1.715
Maximum	0.42	Maximum of Log Data	-0.868
Mean	0.298	Mean of log Data	-1.222
Median	0.298	SD of log Data	0.143
SD	0.0403		
Coefficient of Variation	0.135		
Skewness	0.111		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.572
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.312	95% H-UCL	0.314
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.336
95% Adjusted-CLT UCL (Chen-1995)	0.311	97.5% Chebyshev (MVUE) UCL	0.352
95% Modified-t UCL (Johnson-1978)	0.312	99% Chebyshev (MVUE) UCL	0.385

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	46.99	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00633		
MLE of Mean	0.298		
MLE of Standard Deviation	0.0434		
nu star	2256		
Approximate Chi Square Value (.05)	2146	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	0.311
Adjusted Chi Square Value	2139	95% Jackknife UCL	0.312
		95% Standard Bootstrap UCL	0.311
Anderson-Darling Test Statistic	5.272	95% Bootstrap-t UCL	0.312
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.318
Kolmogorov-Smirnov Test Statistic	0.435	95% Percentile Bootstrap UCL	0.311
Kolmogorov-Smirnov 5% Critical Value	0.177	95% BCA Bootstrap UCL	0.31
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.333
		97.5% Chebyshev(Mean, Sd) UCL	0.349
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.379
95% Approximate Gamma UCL	0.313		
95% Adjusted Gamma UCL	0.314		

Potential UCL to Use

Use 95% Student's-t UCL 0.312
or 95% Modified-t UCL 0.312

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.0072	Minimum of Log Data -4.934
Maximum	0.478	Maximum of Log Data -0.737
Mean	0.301	Mean of log Data -1.322
Median	0.301	SD of log Data 0.778
SD	0.0756	
Coefficient of Variation	0.251	
Skewness	-2.006	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.467	Shapiro Wilk Test Statistic 0.284
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value 0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.328	95% H-UCL 0.521
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.622
95% Adjusted-CLT UCL (Chen-1995)	0.32	97.5% Chebyshev (MVUE) UCL 0.738
95% Modified-t UCL (Johnson-1978)	0.327	99% Chebyshev (MVUE) UCL 0.965

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	3.734	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0807	
MLE of Mean	0.301	
MLE of Standard Deviation	0.156	
nu star	179.2	
Approximate Chi Square Value (.05)	149.3	Nonparametric Statistics
Adjusted Level of Significance	0.0392	95% CLT UCL 0.327
Adjusted Chi Square Value	147.4	95% Jackknife UCL 0.328
		95% Standard Bootstrap UCL 0.326
Anderson-Darling Test Statistic	7.188	95% Bootstrap-t UCL 0.324
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL 0.325
Kolmogorov-Smirnov Test Statistic	0.523	95% Percentile Bootstrap UCL 0.323
Kolmogorov-Smirnov 5% Critical Value	0.179	95% BCA Bootstrap UCL 0.321
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.369
		97.5% Chebyshev(Mean, Sd) UCL 0.398
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.455
95% Approximate Gamma UCL	0.362	
95% Adjusted Gamma UCL	0.367	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.369

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	2.1 Minimum of Log Data	0.742
Maximum	30.24 Maximum of Log Data	3.409
Mean	15.46 Mean of log Data	2.637
Median	15.46 SD of log Data	0.552
SD	5.449	
Coefficient of Variation	0.353	
Skewness	-0.202	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.836 Shapiro Wilk Test Statistic	0.655
Shapiro Wilk Critical Value	0.916 Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	17.36 95% H-UCL	20.54
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	24.46
95% Adjusted-CLT UCL (Chen-1995)	17.24 97.5% Chebyshev (MVUE) UCL	28.05
95% Modified-t UCL (Johnson-1978)	17.35 99% Chebyshev (MVUE) UCL	35.11

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	4.496 Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.438	
MLE of Mean	15.46	
MLE of Standard Deviation	7.289	
nu star	215.8	
Approximate Chi Square Value (.05)	182.8 Nonparametric Statistics	
Adjusted Level of Significance	0.0392 95% CLT UCL	17.29
Adjusted Chi Square Value	180.7 95% Jackknife UCL	17.36
	95% Standard Bootstrap UCL	17.19
Anderson-Darling Test Statistic	2.814 95% Bootstrap-t UCL	17.22
Anderson-Darling 5% Critical Value	0.746 95% Hall's Bootstrap UCL	17.39
Kolmogorov-Smirnov Test Statistic	0.351 95% Percentile Bootstrap UCL	17.2
Kolmogorov-Smirnov 5% Critical Value	0.178 95% BCA Bootstrap UCL	17.15
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	20.3
	97.5% Chebyshev(Mean, Sd) UCL	22.4
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	26.52
95% Approximate Gamma UCL	18.25	
95% Adjusted Gamma UCL	18.46	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 20.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 24 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.058	Minimum of Log Data -2.847
Maximum	0.259	Maximum of Log Data -1.351
Mean	0.153	Mean of log Data -1.899
Median	0.153	SD of log Data 0.23
SD	0.0298	
Coefficient of Variation	0.195	
Skewness	0.597	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.431	Shapiro Wilk Test Statistic 0.399
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value 0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.163	95% H-UCL 0.167
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.185
95% Adjusted-CLT UCL (Chen-1995)	0.164	97.5% Chebyshev (MVUE) UCL 0.199
95% Modified-t UCL (Johnson-1978)	0.164	99% Chebyshev (MVUE) UCL 0.226

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	20.43	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.00749	
MLE of Mean	0.153	
MLE of Standard Deviation	0.0338	
nu star	980.9	
Approximate Chi Square Value (.05)	909.2	Nonparametric Statistics
Adjusted Level of Significance	0.0392	95% CLT UCL 0.163
Adjusted Chi Square Value	904.3	95% Jackknife UCL 0.163
		95% Standard Bootstrap UCL 0.163
Anderson-Darling Test Statistic	6.801	95% Bootstrap-t UCL 0.163
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL 0.169
Kolmogorov-Smirnov Test Statistic	0.444	95% Percentile Bootstrap UCL 0.162
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL 0.162
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.179
		97.5% Chebyshev(Mean, Sd) UCL 0.191
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.213
95% Approximate Gamma UCL	0.165	
95% Adjusted Gamma UCL	0.166	

Potential UCL to Use Use 95% Student's-t UCL 0.163
 or 95% Modified-t UCL 0.164

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	24	Number of Distinct Observations	4
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Raw Statistics

Minimum	1.09	Minimum of Log Data	0.0862
Maximum	6.5	Maximum of Log Data	1.872
Mean	3.507	Mean of log Data	1.224
Median	3.507	SD of log Data	0.276
SD	0.811		
Coefficient of Variation	0.231		
Skewness	1.112		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.45	Shapiro Wilk Test Statistic	0.419
Shapiro Wilk Critical Value	0.916	Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.79	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3.923
95% Adjusted-CLT UCL (Chen-1995)	3.819	95% Chebyshev (MVUE) UCL	4.407
95% Modified-t UCL (Johnson-1978)	3.797	97.5% Chebyshev (MVUE) UCL	4.787
		99% Chebyshev (MVUE) UCL	5.534

Gamma Distribution Test

k star (bias corrected)	14.54	Data Distribution	
Theta Star	0.241	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.507		
MLE of Standard Deviation	0.92		
nu star	697.7		
Approximate Chi Square Value (.05)	637.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0392	95% CLT UCL	3.779
Adjusted Chi Square Value	633.4	95% Jackknife UCL	3.79
		95% Standard Bootstrap UCL	3.778
Anderson-Darling Test Statistic	6.508	95% Bootstrap-t UCL	3.801
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	4.077
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	3.78
Kolmogorov-Smirnov 5% Critical Value	0.178	95% BCA Bootstrap UCL	3.833
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.228
		97.5% Chebyshev(Mean, Sd) UCL	4.541
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.154
95% Approximate Gamma UCL	3.838		
95% Adjusted Gamma UCL	3.863		

Potential UCL to Use

Use 95% Student's-t UCL	3.79
or 95% Modified-t UCL	3.797

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Time
 User Selected Options
 From File 138-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	6730 Minimum of Log Data	8.814
Maximum	13000 Maximum of Log Data	9.473
Mean	10427 Mean of log Data	9.247
Median	10427 SD of log Data	0.105
SD	983.7	
Coefficient of Variation	0.0943	
Skewness	-1.4	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.591 Shapiro Wilk Test Statistic	0.547
Shapiro Wilk Critical Value	0.923 Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10750	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10806
95% Adjusted-CLT UCL (Chen-1995)	10684	95% Chebyshev (MVUE) UCL	11347
95% Modified-t UCL (Johnson-1978)	10741	97.5% Chebyshev (MVUE) UCL	11744
		99% Chebyshev (MVUE) UCL	12522

Gamma Distribution Test

k star (bias corrected)	91.3	Data Distribution	
Theta Star	114.2	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10427		
MLE of Standard Deviation	1091		
nu star	4930		
Approximate Chi Square Value (.05)	4768	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	10738
Adjusted Chi Square Value	4758	95% Jackknife UCL	10750
		95% Standard Bootstrap UCL	10739
Anderson-Darling Test Statistic	5.524	95% Bootstrap-t UCL	10702
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	10746
Kolmogorov-Smirnov Test Statistic	0.439	95% Percentile Bootstrap UCL	10714
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	10676
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11252
		97.5% Chebyshev(Mean, Sd) UCL	11609
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12310
95% Approximate Gamma UCL	10781		
95% Adjusted Gamma UCL	10804		

Potential UCL to Use Use 95% Student's-t UCL 10750
 or 95% Modified-t UCL 10741

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.18	Minimum of Log Data	-1.715
Maximum	7.34	Maximum of Log Data	1.993
Mean	3.035	Mean of log Data	0.754
Median	3.035	SD of log Data	1.081
SD	1.808		
Coefficient of Variation	0.596		
Skewness	0.0578		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Test Statistic	0.729
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	3.629	95% H-UCL	6.652
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.569
95% Adjusted-CLT UCL (Chen-1995)	3.612	97.5% Chebyshev (MVUE) UCL	9.248
95% Modified-t UCL (Johnson-1978)	3.63	99% Chebyshev (MVUE) UCL	12.55

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.402	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.166		
MLE of Mean	3.035		
MLE of Standard Deviation	2.564		
nu star	75.69		
Approximate Chi Square Value (.05)	56.65	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	3.608
Adjusted Chi Square Value	55.59	95% Jackknife UCL	3.629
		95% Standard Bootstrap UCL	3.599
Anderson-Darling Test Statistic	2.943	95% Bootstrap-t UCL	3.615
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL	3.63
Kolmogorov-Smirnov Test Statistic	0.384	95% Percentile Bootstrap UCL	3.605
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	3.579
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.552
		97.5% Chebyshev(Mean, Sd) UCL	5.209
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.498
95% Approximate Gamma UCL	4.056		
95% Adjusted Gamma UCL	4.132		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 4.552

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 25

Raw Statistics

		Log-transformed Statistics	
Minimum	5.39	Minimum of Log Data	1.685
Maximum	15.45	Maximum of Log Data	2.738
Mean	9.669	Mean of log Data	2.219
Median	8.79	SD of log Data	0.321
SD	3.137		
Coefficient of Variation	0.324		
Skewness	0.548		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.914	Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.7	95% H-UCL	10.87
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.32
95% Adjusted-CLT UCL (Chen-1995)	10.73	97.5% Chebyshev (MVUE) UCL	13.47
95% Modified-t UCL (Johnson-1978)	10.71	99% Chebyshev (MVUE) UCL	15.72

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	9.084	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.064		
MLE of Mean	9.669		
MLE of Standard Deviation	3.208		
nu star	490.5		
Approximate Chi Square Value (.05)	440.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	10.66
Adjusted Chi Square Value	437.1	95% Jackknife UCL	10.7
		95% Standard Bootstrap UCL	10.61
Anderson-Darling Test Statistic	0.535	95% Bootstrap-t UCL	10.78
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	10.75
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	10.71
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	10.72
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.3
		97.5% Chebyshev(Mean, Sd) UCL	13.44
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.68
95% Approximate Gamma UCL	10.77		
95% Adjusted Gamma UCL	10.85		

Potential UCL to Use

Use 95% Approximate Gamma UCL 10.77

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	65.9	Minimum of Log Data	4.188
Maximum	529	Maximum of Log Data	6.271
Mean	171.4	Mean of log Data	5.067
Median	171.4	SD of log Data	0.377
SD	83.69		
Coefficient of Variation	0.488		
Skewness	3.203		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.629	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	198.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	195.6
95% Adjusted-CLT UCL (Chen-1995)	208.5	95% Chebyshev (MVUE) UCL	224.9
95% Modified-t UCL (Johnson-1978)	200.5	97.5% Chebyshev (MVUE) UCL	248.7
		99% Chebyshev (MVUE) UCL	295.5

Gamma Distribution Test

k star (bias corrected)	5.933	Data Distribution	
Theta Star	28.88	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	171.4		
MLE of Standard Deviation	70.35		
nu star	320.4		
Approximate Chi Square Value (.05)	279.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	197.8
Adjusted Chi Square Value	277.5	95% Jackknife UCL	198.8
		95% Standard Bootstrap UCL	197.8
Anderson-Darling Test Statistic	2.278	95% Bootstrap-t UCL	223.9
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	338.4
Kolmogorov-Smirnov Test Statistic	0.322	95% Percentile Bootstrap UCL	199.9
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	212.2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	241.6
		97.5% Chebyshev(Mean, Sd) UCL	271.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	331.6
95% Approximate Gamma UCL	196.1		
95% Adjusted Gamma UCL	197.8		

Potential UCL to Use

Use 95% Student's-t UCL 198.8
or 95% Modified-t UCL 200.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data	-1.139
Maximum	0.86	Maximum of Log Data	-0.151
Mean	0.597	Mean of log Data	-0.529
Median	0.597	SD of log Data	0.17
SD	0.0958		
Coefficient of Variation	0.161		
Skewness	0.439		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.604	Shapiro Wilk Test Statistic	0.592
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.628	95% H-UCL	0.633
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.682
95% Adjusted-CLT UCL (Chen-1995)	0.629	97.5% Chebyshev (MVUE) UCL	0.719
95% Modified-t UCL (Johnson-1978)	0.628	99% Chebyshev (MVUE) UCL	0.792

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	34.1	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0175		
MLE of Mean	0.597		
MLE of Standard Deviation	0.102		
nu star	1841		
Approximate Chi Square Value (.05)	1743	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	0.627
Adjusted Chi Square Value	1737	95% Jackknife UCL	0.628
		95% Standard Bootstrap UCL	0.626
Anderson-Darling Test Statistic	5.496	95% Bootstrap-t UCL	0.63
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	0.653
Kolmogorov-Smirnov Test Statistic	0.404	95% Percentile Bootstrap UCL	0.628
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	0.628
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.677
		97.5% Chebyshev(Mean, Sd) UCL	0.712
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.78
95% Approximate Gamma UCL	0.63		
95% Adjusted Gamma UCL	0.633		

Potential UCL to Use

Use 95% Student's-t UCL 0.628
or 95% Modified-t UCL 0.628

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	0.024	Minimum of Log Data	-3.73
Maximum	7.3	Maximum of Log Data	1.988
Mean	3.347	Mean of log Data	0.713
Median	3.347	SD of log Data	1.504
SD	1.816		
Coefficient of Variation	0.543		
Skewness	-0.438		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test	0.844	Shapiro Wilk Test Statistic	0.628
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Critical Value	0.923
Shapiro Wilk Critical Value		Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	3.943	95% H-UCL	16.45
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	15
95% Adjusted-CLT UCL (Chen-1995)	3.891	97.5% Chebyshev (MVUE) UCL	18.97
95% Modified-t UCL (Johnson-1978)	3.938	99% Chebyshev (MVUE) UCL	26.76

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.044	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.206		
MLE of Mean	3.347		
MLE of Standard Deviation	3.276		
nu star	56.39		
Approximate Chi Square Value (.05)	40.13	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	3.922
Adjusted Chi Square Value	39.25	95% Jackknife UCL	3.943
		95% Standard Bootstrap UCL	3.917
Anderson-Darling Test Statistic	4.094	95% Bootstrap-t UCL	3.939
Anderson-Darling 5% Critical Value	0.77	95% Hall's Bootstrap UCL	3.93
Kolmogorov-Smirnov Test Statistic	0.438	95% Percentile Bootstrap UCL	3.907
Kolmogorov-Smirnov 5% Critical Value	0.173	95% BCA Bootstrap UCL	3.874
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.871
		97.5% Chebyshev(Mean, Sd) UCL	5.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.825
95% Approximate Gamma UCL	4.703		
95% Adjusted Gamma UCL	4.809		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 4.871

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 20

Raw Statistics

	Log-transformed Statistics	
Minimum	5 Minimum of Log Data	1.609
Maximum	85 Maximum of Log Data	4.443
Mean	53.27 Mean of log Data	3.837
Median	46.07 SD of log Data	0.625
SD	23.68	
Coefficient of Variation	0.444	
Skewness	0.0995	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.879 Shapiro Wilk Test Statistic	0.789
Shapiro Wilk Critical Value	0.923 Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	61.04 95% H-UCL	72.87
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	87.16
95% Adjusted-CLT UCL (Chen-1995)	60.86 97.5% Chebyshev (MVUE) UCL	100.7
95% Modified-t UCL (Johnson-1978)	61.06 99% Chebyshev (MVUE) UCL	127.2

Gamma Distribution Test

k star (bias corrected)	3.38	Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.76		
MLE of Mean	53.27		
MLE of Standard Deviation	28.98		
nu star	182.5		
Approximate Chi Square Value (.05)	152.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	60.77
Adjusted Chi Square Value	150.5	95% Jackknife UCL	61.04
		95% Standard Bootstrap UCL	60.71
Anderson-Darling Test Statistic	1.19	95% Bootstrap-t UCL	61.1
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	60.99
Kolmogorov-Smirnov Test Statistic	0.171	95% Percentile Bootstrap UCL	60.79
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL	60.18
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	73.13
		97.5% Chebyshev(Mean, Sd) UCL	81.73
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	98.61
95% Approximate Gamma UCL	63.86		
95% Adjusted Gamma UCL	64.6		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 73.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	2.7 Minimum of Log Data	0.993
Maximum	17.6 Maximum of Log Data	2.868
Mean	8.45 Mean of log Data	2.1
Median	8.45 SD of log Data	0.282
SD	2.235	
Coefficient of Variation	0.264	
Skewness	2.025	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test	0.52 Shapiro Wilk Test Statistic	0.534
Shapiro Wilk Test Statistic	0.923 Shapiro Wilk Critical Value	0.923
Shapiro Wilk Critical Value		
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	9.184 95% H-UCL	9.391
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	10.52
95% Adjusted-CLT UCL (Chen-1995)	9.336 97.5% Chebyshev (MVUE) UCL	11.4
95% Modified-t UCL (Johnson-1978)	9.211 99% Chebyshev (MVUE) UCL	13.13

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	13.14 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.643	
MLE of Mean	8.45	
MLE of Standard Deviation	2.331	
nu star	709.7	
Approximate Chi Square Value (.05)	648.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0401 95% CLT UCL	9.157
Adjusted Chi Square Value	645.2 95% Jackknife UCL	9.184
	95% Standard Bootstrap UCL	9.149
Anderson-Darling Test Statistic	5.938 95% Bootstrap-t UCL	9.319
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	13.33
Kolmogorov-Smirnov Test Statistic	0.424 95% Percentile Bootstrap UCL	9.176
Kolmogorov-Smirnov 5% Critical Value	0.168 95% BCA Bootstrap UCL	9.389
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	10.32
	97.5% Chebyshev(Mean, Sd) UCL	11.14
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	12.73
95% Approximate Gamma UCL	9.242	
95% Adjusted Gamma UCL	9.295	

Potential UCL to Use

Use 95% Student's-t UCL 9.184
or 95% Modified-t UCL 9.211

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 27

Raw Statistics

		Log-transformed Statistics	
Minimum	11911	Minimum of Log Data	9.385
Maximum	40820	Maximum of Log Data	10.62
Mean	17816	Mean of log Data	9.743
Median	15188	SD of log Data	0.284
SD	6283		
Coefficient of Variation	0.353		
Skewness	2.349		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.725	Shapiro Wilk Test Statistic	0.837
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19879	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	19625
95% Adjusted-CLT UCL (Chen-1995)	20389	95% Chebyshev (MVUE) UCL	21996
95% Modified-t UCL (Johnson-1978)	19970	97.5% Chebyshev (MVUE) UCL	23847
		99% Chebyshev (MVUE) UCL	27485

Gamma Distribution Test

k star (bias corrected)	10.18	Data Distribution	
Theta Star	1751	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	17816		
MLE of Standard Deviation	5585		
nu star	549.5		
Approximate Chi Square Value (.05)	496.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	19805
Adjusted Chi Square Value	492.9	95% Jackknife UCL	19879
		95% Standard Bootstrap UCL	19814
Anderson-Darling Test Statistic	1.918	95% Bootstrap-t UCL	21218
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	23575
Kolmogorov-Smirnov Test Statistic	0.251	95% Percentile Bootstrap UCL	19857
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	20252
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23087
		97.5% Chebyshev(Mean, Sd) UCL	25368
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	29848
95% Approximate Gamma UCL	19732		
95% Adjusted Gamma UCL	19862		

Potential UCL to Use

Use 95% Student's-t UCL 19879
or 95% Modified-t UCL 19970

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 27

Raw Statistics

		Log-transformed Statistics	
Minimum	294.4	Minimum of Log Data	5.685
Maximum	1230	Maximum of Log Data	7.115
Mean	575.8	Mean of log Data	6.285
Median	510.9	SD of log Data	0.374
SD	235		
Coefficient of Variation	0.408		
Skewness	1.222		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	653	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	660.2
95% Adjusted-CLT UCL (Chen-1995)	661.6	95% Chebyshev (MVUE) UCL	758.5
95% Modified-t UCL (Johnson-1978)	654.8	97.5% Chebyshev (MVUE) UCL	838.4
		99% Chebyshev (MVUE) UCL	995.3

Gamma Distribution Test

k star (bias corrected)	6.449	Data Distribution	
Theta Star	89.3	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	575.8		
MLE of Standard Deviation	226.8		
nu star	348.2		
Approximate Chi Square Value (.05)	306	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	650.2
Adjusted Chi Square Value	303.5	95% Jackknife UCL	653
		95% Standard Bootstrap UCL	647.1
Anderson-Darling Test Statistic	0.472	95% Bootstrap-t UCL	667.4
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	666.4
Kolmogorov-Smirnov Test Statistic	0.098	95% Percentile Bootstrap UCL	652.4
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	664.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	773
		97.5% Chebyshev(Mean, Sd) UCL	858.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1026
95% Approximate Gamma UCL	655.3		
95% Adjusted Gamma UCL	660.8		

Potential UCL to Use Use 95% Approximate Gamma UCL 655.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0141	Minimum of Log Data	-4.262
Maximum	21.3	Maximum of Log Data	3.059
Mean	8.3	Mean of log Data	1.328
Median	10	SD of log Data	2.125
SD	5.203		
Coefficient of Variation	0.627		
Skewness	0.25		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.833	Shapiro Wilk Test Statistic	0.607
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	211.7
95% Adjusted-CLT UCL (Chen-1995)	9.999	95% Chebyshev (MVUE) UCL	96.81
95% Modified-t UCL (Johnson-1978)	10.02	97.5% Chebyshev (MVUE) UCL	126.2
		99% Chebyshev (MVUE) UCL	184.1

Gamma Distribution Test

k star (bias corrected)	0.698	Data Distribution	
Theta Star	11.88	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.3		
MLE of Standard Deviation	9.932		
nu star	37.71		
Approximate Chi Square Value (.05)	24.65	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	9.947
Adjusted Chi Square Value	23.98	95% Jackknife UCL	10.01
		95% Standard Bootstrap UCL	9.956
Anderson-Darling Test Statistic	4.241	95% Bootstrap-t UCL	10.03
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL	10.09
Kolmogorov-Smirnov Test Statistic	0.346	95% Percentile Bootstrap UCL	9.901
Kolmogorov-Smirnov 5% Critical Value	0.175	95% BCA Bootstrap UCL	9.944
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.66
		97.5% Chebyshev(Mean, Sd) UCL	14.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.26
95% Approximate Gamma UCL	12.7		
95% Adjusted Gamma UCL	13.06		

Potential UCL to Use

Use 97.5% Chebyshev (Mean, Sd) UCL 14.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 18

Raw Statistics

Minimum	5	Minimum of Log Data	1.609
Maximum	101.7	Maximum of Log Data	4.622
Mean	51.2	Mean of log Data	3.602
Median	65	SD of log Data	0.984
SD	30.83		
Coefficient of Variation	0.602		
Skewness	-0.372		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.817	Shapiro Wilk Test Statistic	0.762
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	61.32	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	96.4
95% Adjusted-CLT UCL (Chen-1995)	60.5	95% Chebyshev (MVUE) UCL	112.5
95% Modified-t UCL (Johnson-1978)	61.25	97.5% Chebyshev (MVUE) UCL	136.1
		99% Chebyshev (MVUE) UCL	182.4

Gamma Distribution Test

k star (bias corrected)	1.487	Data Distribution	
Theta Star	34.44	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	51.2		
MLE of Standard Deviation	41.99		
nu star	80.27		
Approximate Chi Square Value (.05)	60.63	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	60.96
Adjusted Chi Square Value	59.54	95% Jackknife UCL	61.32
		95% Standard Bootstrap UCL	61.29
Anderson-Darling Test Statistic	3.052	95% Bootstrap-t UCL	60.46
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	60.23
Kolmogorov-Smirnov Test Statistic	0.378	95% Percentile Bootstrap UCL	60.58
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	60.12
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	77.06
		97.5% Chebyshev(Mean, Sd) UCL	88.26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	110.2
95% Approximate Gamma UCL	67.78		
95% Adjusted Gamma UCL	69.03		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 77.06

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	0.1 Minimum of Log Data	-2.303
Maximum	5 Maximum of Log Data	1.609
Mean	1.408 Mean of log Data	-0.236
Median	1.408 SD of log Data	1.271
SD	1.412	
Coefficient of Variation	1.003	
Skewness	1.812	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.676 Shapiro Wilk Test Statistic	0.79
Shapiro Wilk Critical Value	0.923 Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1.872 95% H-UCL	3.643
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	3.84
95% Adjusted-CLT UCL (Chen-1995)	1.957 97.5% Chebyshev (MVUE) UCL	4.773
95% Modified-t UCL (Johnson-1978)	1.888 99% Chebyshev (MVUE) UCL	6.605

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.912 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.545	
MLE of Mean	1.408	
MLE of Standard Deviation	1.475	
nu star	49.23	
Approximate Chi Square Value (.05)	34.12 Nonparametric Statistics	
Adjusted Level of Significance	0.0401 95% CLT UCL	1.855
Adjusted Chi Square Value	33.32 95% Jackknife UCL	1.872
	95% Standard Bootstrap UCL	1.846
Anderson-Darling Test Statistic	2.29 95% Bootstrap-t UCL	2.04
Anderson-Darling 5% Critical Value	0.773 95% Hall's Bootstrap UCL	1.985
Kolmogorov-Smirnov Test Statistic	0.299 95% Percentile Bootstrap UCL	1.846
Kolmogorov-Smirnov 5% Critical Value	0.173 95% BCA Bootstrap UCL	2.039
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	2.593
	97.5% Chebyshev(Mean, Sd) UCL	3.105
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	4.112
95% Approximate Gamma UCL	2.032	
95% Adjusted Gamma UCL	2.081	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.593

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.021	Minimum of Log Data	-3.863
Maximum	10.09	Maximum of Log Data	2.312
Mean	6.836	Mean of log Data	0.969
Median		10 SD of log Data	2.264
SD	4.149		
Coefficient of Variation	0.607		
Skewness	-0.82		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.709	Shapiro Wilk Test Statistic	0.611
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.198	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	250.2
95% Adjusted-CLT UCL (Chen-1995)	8.015	95% Chebyshev (MVUE) UCL	91.84
95% Modified-t UCL (Johnson-1978)	8.177	97.5% Chebyshev (MVUE) UCL	120.3
		99% Chebyshev (MVUE) UCL	176.3

Gamma Distribution Test

k star (bias corrected)	0.595	Data Distribution	
Theta Star	11.48	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	6.836		
MLE of Standard Deviation	8.859		
nu star	32.16		
Approximate Chi Square Value (.05)	20.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	8.15
Adjusted Chi Square Value	19.59	95% Jackknife UCL	8.198
		95% Standard Bootstrap UCL	8.108
Anderson-Darling Test Statistic	4.937	95% Bootstrap-t UCL	8.056
Anderson-Darling 5% Critical Value	0.794	95% Hall's Bootstrap UCL	7.979
Kolmogorov-Smirnov Test Statistic	0.353	95% Percentile Bootstrap UCL	8.101
Kolmogorov-Smirnov 5% Critical Value	0.176	95% BCA Bootstrap UCL	7.97
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.32
		97.5% Chebyshev(Mean, Sd) UCL	11.82
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.78
95% Approximate Gamma UCL	10.89		
95% Adjusted Gamma UCL	11.22		

Potential UCL to Use

Use 97.5% Chebyshev (Mean, Sd) UCL 11.82

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.19	Minimum of Log Data	-1.661
Maximum		5 Maximum of Log Data	1.609
Mean	2.843	Mean of log Data	0.686
Median	2.843	SD of log Data	1.093
SD	1.649		
Coefficient of Variation	0.58		
Skewness	-0.246		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.703
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	3.384	95% H-UCL	6.363
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.211
95% Adjusted-CLT UCL (Chen-1995)	3.349	97.5% Chebyshev (MVUE) UCL	8.822
95% Modified-t UCL (Johnson-1978)	3.382	99% Chebyshev (MVUE) UCL	11.98

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.391	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.044		
MLE of Mean	2.843		
MLE of Standard Deviation	2.411		
nu star	75.1		
Approximate Chi Square Value (.05)	56.14	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	3.365
Adjusted Chi Square Value	55.09	95% Jackknife UCL	3.384
		95% Standard Bootstrap UCL	3.359
Anderson-Darling Test Statistic	3.102	95% Bootstrap-t UCL	3.35
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	3.348
Kolmogorov-Smirnov Test Statistic	0.385	95% Percentile Bootstrap UCL	3.358
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	3.34
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.227
		97.5% Chebyshev(Mean, Sd) UCL	4.825
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.001
95% Approximate Gamma UCL	3.803		
95% Adjusted Gamma UCL	3.876		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 4.227

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

27 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	15.3	Minimum of Log Data	2.728
Maximum	42.8	Maximum of Log Data	3.757
Mean	28.53	Mean of log Data	3.34
Median	28.53	SD of log Data	0.157
SD	4.118		
Coefficient of Variation	0.144		
Skewness	0.188		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.558	Shapiro Wilk Test Statistic	0.535
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	29.88	95% H-UCL	30.14
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	32.34
95% Adjusted-CLT UCL (Chen-1995)	29.87	97.5% Chebyshev (MVUE) UCL	33.97
95% Modified-t UCL (Johnson-1978)	29.89	99% Chebyshev (MVUE) UCL	37.19

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	40.56	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.703		
MLE of Mean	28.53		
MLE of Standard Deviation	4.48		
nu star	2190		
Approximate Chi Square Value (.05)	2083	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	29.84
Adjusted Chi Square Value	2076	95% Jackknife UCL	29.88
		95% Standard Bootstrap UCL	29.82
Anderson-Darling Test Statistic	6.004	95% Bootstrap-t UCL	29.81
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	30.42
Kolmogorov-Smirnov Test Statistic	0.446	95% Percentile Bootstrap UCL	29.82
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	29.86
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	31.99
		97.5% Chebyshev(Mean, Sd) UCL	33.48
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	36.42
95% Approximate Gamma UCL	30.01		
95% Adjusted Gamma UCL	30.11		

Potential UCL to Use

Use 95% Student's-t UCL 29.88
or 95% Modified-t UCL 29.89

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	138-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	11
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Raw Statistics

		Log-transformed Statistics	
Minimum	2.9	Minimum of Log Data	1.065
Maximum	11.82	Maximum of Log Data	2.47
Mean	9.304	Mean of log Data	2.175
Median	11	SD of log Data	0.375
SD	2.651		
Coefficient of Variation	0.285		
Skewness	-1.209		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.748	Shapiro Wilk Test Statistic	0.707
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.13
95% Adjusted-CLT UCL (Chen-1995)	10.11	95% Chebyshev (MVUE) UCL	12.93
95% Modified-t UCL (Johnson-1978)	10.3	97.5% Chebyshev (MVUE) UCL	14.45
		99% Chebyshev (MVUE) UCL	17.44

Gamma Distribution Test

k star (bias corrected)	7.877	Data Distribution	
Theta Star	1.181	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.304		
MLE of Standard Deviation	3.315		
nu star	315.1		
Approximate Chi Square Value (.05)	275	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	10.28
Adjusted Chi Square Value	272	95% Jackknife UCL	10.33
		95% Standard Bootstrap UCL	10.26
Anderson-Darling Test Statistic	2.523	95% Bootstrap-t UCL	10.22
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	10.08
Kolmogorov-Smirnov Test Statistic	0.336	95% Percentile Bootstrap UCL	10.21
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	10.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.89
		97.5% Chebyshev(Mean, Sd) UCL	13.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.2
95% Approximate Gamma UCL	10.66		
95% Adjusted Gamma UCL	10.78		

Potential UCL to Use		Use 95% Student's-t UCL	10.33
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.019 Minimum of Log Data	-3.963
Maximum	0.93 Maximum of Log Data	-0.0726
Mean	0.335 Mean of log Data	-1.277
Median	0.335 SD of log Data	0.791
SD	0.169	
Coefficient of Variation	0.506	
Skewness	1.89	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.595 Shapiro Wilk Test Statistic	0.551
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.401	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.583
95% Adjusted-CLT UCL (Chen-1995)	0.415	95% Chebyshev (MVUE) UCL	0.685
95% Modified-t UCL (Johnson-1978)	0.403	97.5% Chebyshev (MVUE) UCL	0.82
		99% Chebyshev (MVUE) UCL	1.085

Gamma Distribution Test

k star (bias corrected)	2.47	Data Distribution	
Theta Star	0.136	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.335		
MLE of Standard Deviation	0.213		
nu star	98.79		
Approximate Chi Square Value (.05)	76.86	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	0.398
Adjusted Chi Square Value	75.33	95% Jackknife UCL	0.401
		95% Standard Bootstrap UCL	0.395
Anderson-Darling Test Statistic	4.066	95% Bootstrap-t UCL	0.412
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	0.76
Kolmogorov-Smirnov Test Statistic	0.429	95% Percentile Bootstrap UCL	0.4
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	0.415
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.5
		97.5% Chebyshev(Mean, Sd) UCL	0.572
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.712
95% Approximate Gamma UCL	0.431		
95% Adjusted Gamma UCL	0.44		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 16

Raw Statistics

	Log-transformed Statistics	
Minimum	11.3 Minimum of Log Data	2.425
Maximum	85 Maximum of Log Data	4.443
Mean	50.34 Mean of log Data	3.776
Median	47.04 SD of log Data	0.599
SD	24.35	
Coefficient of Variation	0.484	
Skewness	0.199	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.903 Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	59.75	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.9
95% Adjusted-CLT UCL (Chen-1995)	59.55	95% Chebyshev (MVUE) UCL	83.41
95% Modified-t UCL (Johnson-1978)	59.79	97.5% Chebyshev (MVUE) UCL	97.14
		99% Chebyshev (MVUE) UCL	124.1

Gamma Distribution Test

k star (bias corrected)	3.139	Data Distribution	
Theta Star	16.04	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	50.34		
MLE of Standard Deviation	28.41		
nu star	125.6		
Approximate Chi Square Value (.05)	100.7	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	59.29
Adjusted Chi Square Value	98.91	95% Jackknife UCL	59.75
		95% Standard Bootstrap UCL	59.17
Anderson-Darling Test Statistic	0.654	95% Bootstrap-t UCL	59.56
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	59.69
Kolmogorov-Smirnov Test Statistic	0.147	95% Percentile Bootstrap UCL	59.32
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	59.46
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.07
		97.5% Chebyshev(Mean, Sd) UCL	84.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.5
95% Approximate Gamma UCL	62.78		
95% Adjusted Gamma UCL	63.89		

Potential UCL to Use Use 95% Approximate Gamma UCL 62.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 7

Raw Statistics

Minimum	0.0094	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.667
Mean	7.426	Maximum of Log Data	2.303
Median	10	Mean of log Data	0.835
SD	4.388	SD of log Data	2.633
Coefficient of Variation	0.591		
Skewness	-1.226		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.571	Shapiro Wilk Test Statistic	0.59
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.123	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2009
95% Adjusted-CLT UCL (Chen-1995)	8.753	95% Chebyshev (MVUE) UCL	174.5
95% Modified-t UCL (Johnson-1978)	9.078	97.5% Chebyshev (MVUE) UCL	231.7
		99% Chebyshev (MVUE) UCL	344

Gamma Distribution Test

k star (bias corrected)	0.49	Data Distribution	
Theta Star	15.16	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.426		
MLE of Standard Deviation	10.61		
nu star	19.59		
Approximate Chi Square Value (.05)	10.55	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	9.04
Adjusted Chi Square Value	10.03	95% Jackknife UCL	9.123
		95% Standard Bootstrap UCL	9.003
Anderson-Darling Test Statistic	4.843	95% Bootstrap-t UCL	8.844
Anderson-Darling 5% Critical Value	0.799	95% Hall's Bootstrap UCL	8.714
Kolmogorov-Smirnov Test Statistic	0.455	95% Percentile Bootstrap UCL	8.92
Kolmogorov-Smirnov 5% Critical Value	0.204	95% BCA Bootstrap UCL	8.832
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.7
		97.5% Chebyshev(Mean, Sd) UCL	13.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.19
95% Approximate Gamma UCL	13.79		
95% Adjusted Gamma UCL	14.51		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.19
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	6.6 Minimum of Log Data	1.887
Maximum	113.2 Maximum of Log Data	4.729
Mean	66.59 Mean of log Data	3.985
Median	65 SD of log Data	0.845
SD	30.15	
Coefficient of Variation	0.453	
Skewness	-0.681	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test	0.858 Shapiro Wilk Test Statistic	0.658
Shapiro Wilk Test Statistic	0.905 Shapiro Wilk Critical Value	0.905
Shapiro Wilk Critical Value		
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	78.25 95% H-UCL	122.9
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	142.7
95% Adjusted-CLT UCL (Chen-1995)	76.58 97.5% Chebyshev (MVUE) UCL	171.9
95% Modified-t UCL (Johnson-1978)	78.08 99% Chebyshev (MVUE) UCL	229.3

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	2.153 Data do not follow a Discernable Distribution (0.05)	
Theta Star	30.93	
MLE of Mean	66.59	
MLE of Standard Deviation	45.38	
nu star	86.11	
Approximate Chi Square Value (.05)	65.72 Nonparametric Statistics	
Adjusted Level of Significance	0.038 95% CLT UCL	77.68
Adjusted Chi Square Value	64.31 95% Jackknife UCL	78.25
	95% Standard Bootstrap UCL	77.29
Anderson-Darling Test Statistic	2.497 95% Bootstrap-t UCL	77.21
Anderson-Darling 5% Critical Value	0.75 95% Hall's Bootstrap UCL	77.01
Kolmogorov-Smirnov Test Statistic	0.37 95% Percentile Bootstrap UCL	76.81
Kolmogorov-Smirnov 5% Critical Value	0.196 95% BCA Bootstrap UCL	76.23
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	95.98
	97.5% Chebyshev(Mean, Sd) UCL	108.7
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	133.7
95% Approximate Gamma UCL	87.25	
95% Adjusted Gamma UCL	89.16	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 95.98

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	0.092 Minimum of Log Data	-2.386
Maximum	5 Maximum of Log Data	1.609
Mean	3.972 Mean of log Data	1.032
Median	5 SD of log Data	1.239
SD	1.691	
Coefficient of Variation	0.426	
Skewness	-1.806	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.623 Shapiro Wilk Test Statistic	0.515
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.625	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.17
95% Adjusted-CLT UCL (Chen-1995)	4.43	95% Chebyshev (MVUE) UCL	13.64
95% Modified-t UCL (Johnson-1978)	4.6	97.5% Chebyshev (MVUE) UCL	17.08
		99% Chebyshev (MVUE) UCL	23.84

Gamma Distribution Test

k star (bias corrected)	1.38	Data Distribution	
Theta Star	2.877	1.38 Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.972		
MLE of Standard Deviation	3.38		
nu star	55.22		
Approximate Chi Square Value (.05)	39.14	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	4.594
Adjusted Chi Square Value	38.07	95% Jackknife UCL	4.625
		95% Standard Bootstrap UCL	4.592
Anderson-Darling Test Statistic	4.531	95% Bootstrap-t UCL	4.505
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	4.444
Kolmogorov-Smirnov Test Statistic	0.455	95% Percentile Bootstrap UCL	4.511
Kolmogorov-Smirnov 5% Critical Value	0.197	95% BCA Bootstrap UCL	4.446
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.62
		97.5% Chebyshev(Mean, Sd) UCL	6.333
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.734
95% Approximate Gamma UCL	5.603		
95% Adjusted Gamma UCL	5.76		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.62
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	0.026 Minimum of Log Data	-3.65
Maximum	16.51 Maximum of Log Data	2.804
Mean	8.698 Mean of log Data	1.279
Median	10 SD of log Data	2.261
SD	4.73	
Coefficient of Variation	0.544	
Skewness	-1.047	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.734 Shapiro Wilk Test Statistic	0.562
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.53	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	552.6
95% Adjusted-CLT UCL (Chen-1995)	10.17	95% Chebyshev (MVUE) UCL	121.4
95% Modified-t UCL (Johnson-1978)	10.49	97.5% Chebyshev (MVUE) UCL	159.8
		99% Chebyshev (MVUE) UCL	235.3

Gamma Distribution Test

k star (bias corrected)	0.616	Data Distribution	
Theta Star	14.11	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.698		
MLE of Standard Deviation	11.08		
nu star	24.65		
Approximate Chi Square Value (.05)	14.35	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	10.44
Adjusted Chi Square Value	13.73	95% Jackknife UCL	10.53
		95% Standard Bootstrap UCL	10.41
Anderson-Darling Test Statistic	4.68	95% Bootstrap-t UCL	10.24
Anderson-Darling 5% Critical Value	0.785	95% Hall's Bootstrap UCL	10.17
Kolmogorov-Smirnov Test Statistic	0.499	95% Percentile Bootstrap UCL	10.33
Kolmogorov-Smirnov 5% Critical Value	0.202	95% BCA Bootstrap UCL	10.18
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.31
		97.5% Chebyshev(Mean, Sd) UCL	15.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.22
95% Approximate Gamma UCL	14.95		
95% Adjusted Gamma UCL	15.62		

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 15.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.12 Minimum of Log Data	-2.12
Maximum	0.41 Maximum of Log Data	-0.892
Mean	0.266 Mean of log Data	-1.354
Median	0.266 SD of log Data	0.262
SD	0.0623	
Coefficient of Variation	0.234	
Skewness	0.173	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.667 Shapiro Wilk Test Statistic	0.64
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.29	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.298
95% Adjusted-CLT UCL (Chen-1995)	0.289	95% Chebyshev (MVUE) UCL	0.336
95% Modified-t UCL (Johnson-1978)	0.29	97.5% Chebyshev (MVUE) UCL	0.365
		99% Chebyshev (MVUE) UCL	0.424

Gamma Distribution Test

k star (bias corrected)	14.57	Data Distribution	
Theta Star	0.0183	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.266		
MLE of Standard Deviation	0.0697		
nu star	582.9		
Approximate Chi Square Value (.05)	527.9	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	0.289
Adjusted Chi Square Value	523.8	95% Jackknife UCL	0.29
		95% Standard Bootstrap UCL	0.288
Anderson-Darling Test Statistic	3.714	95% Bootstrap-t UCL	0.291
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.302
Kolmogorov-Smirnov Test Statistic	0.382	95% Percentile Bootstrap UCL	0.288
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	0.288
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.327
		97.5% Chebyshev(Mean, Sd) UCL	0.353
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.405
95% Approximate Gamma UCL	0.294		
95% Adjusted Gamma UCL	0.296		

Potential UCL to Use

Use 95% Student's-t UCL 0.29
or 95% Modified-t UCL 0.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 20 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.0384 Minimum of Log Data	-3.26
Maximum	2.5 Maximum of Log Data	0.916
Mean	1.269 Mean of log Data	0.0974
Median	1.269 SD of log Data	0.805
SD	0.399	
Coefficient of Variation	0.315	
Skewness	-4.49E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.448 Shapiro Wilk Test Statistic	0.318
Shapiro Wilk Critical Value	0.905 Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1.424 95% H-UCL	2.357
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	2.762
95% Adjusted-CLT UCL (Chen-1995)	1.416 97.5% Chebyshev (MVUE) UCL	3.312
95% Modified-t UCL (Johnson-1978)	1.424 99% Chebyshev (MVUE) UCL	4.391

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.182 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.399	
MLE of Mean	1.269	
MLE of Standard Deviation	0.712	
nu star	127.3	
Approximate Chi Square Value (.05)	102.2 Nonparametric Statistics	
Adjusted Level of Significance	0.038 95% CLT UCL	1.416
Adjusted Chi Square Value	100.4 95% Jackknife UCL	1.424
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	6.099 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.746 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.519 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.195 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.658
	97.5% Chebyshev(Mean, Sd) UCL	1.827
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2.158
95% Approximate Gamma UCL	1.58	
95% Adjusted Gamma UCL	1.608	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.658

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 138-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Antimony

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	0.34 Minimum of Log Data	-1.079
Maximum	7.34 Maximum of Log Data	1.993
Mean	4.302 Mean of log Data	1.33
Median	4.302 SD of log Data	0.704
SD	1.301	
Coefficient of Variation	0.303	
Skewness	-1.771	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.614 Shapiro Wilk Test Statistic	0.415
Shapiro Wilk Critical Value	0.923 Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.729	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.528
95% Adjusted-CLT UCL (Chen-1995)	4.623	95% Chebyshev (MVUE) UCL	7.839
95% Modified-t UCL (Johnson-1978)	4.715	97.5% Chebyshev (MVUE) UCL	9.159
		99% Chebyshev (MVUE) UCL	11.75

Gamma Distribution Test

k star (bias corrected)	3.606	Data Distribution	
Theta Star	1.193	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.302		
MLE of Standard Deviation	2.266		
nu star	194.7		
Approximate Chi Square Value (.05)	163.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	4.714
Adjusted Chi Square Value	161.6	95% Jackknife UCL	4.729
		95% Standard Bootstrap UCL	4.697
Anderson-Darling Test Statistic	6.486	95% Bootstrap-t UCL	4.661
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	4.654
Kolmogorov-Smirnov Test Statistic	0.492	95% Percentile Bootstrap UCL	4.682
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL	4.613
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.394
		97.5% Chebyshev(Mean, Sd) UCL	5.866
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.794
95% Approximate Gamma UCL	5.126		
95% Adjusted Gamma UCL	5.184		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.394

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics	
Minimum	5.8 Minimum of Log Data	1.758
Maximum	15.45 Maximum of Log Data	2.738
Mean	9.9 Mean of log Data	2.267
Median	11 SD of log Data	0.238
SD	2.203	
Coefficient of Variation	0.223	
Skewness	-0.07	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.898 Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical Value	0.923 Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.62 95% H-UCL	10.78
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	11.91
95% Adjusted-CLT UCL (Chen-1995)	10.59 97.5% Chebyshev (MVUE) UCL	12.77
95% Modified-t UCL (Johnson-1978)	10.62 99% Chebyshev (MVUE) UCL	14.47

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	17.34 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.571	
MLE of Mean	9.9	
MLE of Standard Deviation	2.377	
nu star	936.3	
Approximate Chi Square Value (.05)	866.2 Nonparametric Statistics	
Adjusted Level of Significance	0.0401 95% CLT UCL	10.6
Adjusted Chi Square Value	861.9 95% Jackknife UCL	10.62
	95% Standard Bootstrap UCL	10.59
Anderson-Darling Test Statistic	1.592 95% Bootstrap-t UCL	10.6
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	10.6
Kolmogorov-Smirnov Test Statistic	0.228 95% Percentile Bootstrap UCL	10.57
Kolmogorov-Smirnov 5% Critical Value	0.168 95% BCA Bootstrap UCL	10.56
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	11.75
	97.5% Chebyshev(Mean, Sd) UCL	12.55
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	14.12
95% Approximate Gamma UCL	10.7	
95% Adjusted Gamma UCL	10.75	

Potential UCL to Use

Use 95% Student's-t UCL 10.62
or 95% Modified-t UCL 10.62

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 6

Raw Statistics	Log-transformed Statistics	
Minimum	0.082	Minimum of Log Data -2.501
Maximum	7.3	Maximum of Log Data 1.988
Mean	4.318	Mean of log Data 1.298
Median	4.318	SD of log Data 0.873
SD	1.314	
Coefficient of Variation	0.304	
Skewness	-1.852	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic 0.398
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value 0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)	4.749	95% H-UCL 8.031
95% Adjusted-CLT UCL (Chen-1995)		95% Chebyshev (MVUE) UCL 9.552
95% Modified-t UCL (Johnson-1978)	4.638	97.5% Chebyshev (MVUE) UCL 11.41
	4.734	99% Chebyshev (MVUE) UCL 15.06

Gamma Distribution Test

k star (bias corrected)	Data Distribution	
Theta Star	2.856	Data do not follow a Discernable Distribution (0.05)
MLE of Mean	1.512	
MLE of Standard Deviation	4.318	
nu star	2.555	
Approximate Chi Square Value (.05)	154.2	
Adjusted Level of Significance	126.5	Nonparametric Statistics
Adjusted Chi Square Value	0.0401	95% CLT UCL 4.734
	124.9	95% Jackknife UCL 4.749
		95% Standard Bootstrap UCL 4.727
Anderson-Darling Test Statistic	6.535	95% Bootstrap-t UCL 4.665
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL 4.681
Kolmogorov-Smirnov Test Statistic	0.5	95% Percentile Bootstrap UCL 4.701
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL 4.661
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 5.42
		97.5% Chebyshev(Mean, Sd) UCL 5.897
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 6.834
95% Approximate Gamma UCL	5.264	
95% Adjusted Gamma UCL	5.331	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	27	Number of Distinct Observations	16
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum		5 Minimum of Log Data	1.609
Maximum		85 Maximum of Log Data	4.443
Mean	54.68	Mean of log Data	3.782
Median		44.6 SD of log Data	0.775
SD	29.65		
Coefficient of Variation	0.542		
Skewness	-0.177		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.815	Shapiro Wilk Test Statistic	0.821
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	64.41	95% H-UCL	83.34
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.95
95% Adjusted-CLT UCL (Chen-1995)	63.86	97.5% Chebyshev (MVUE) UCL	117.9
95% Modified-t UCL (Johnson-1978)	64.38	99% Chebyshev (MVUE) UCL	153.2

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	2.185	Data do not follow a Discernable Distribution (0.05)	
Theta Star	25.03		
MLE of Mean	54.68		
MLE of Standard Deviation	36.99		
nu star	118		
Approximate Chi Square Value (.05)	93.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	64.07
Adjusted Chi Square Value	92.53	95% Jackknife UCL	64.41
		95% Standard Bootstrap UCL	63.82
Anderson-Darling Test Statistic	1.71	95% Bootstrap-t UCL	64.55
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	63.57
Kolmogorov-Smirnov Test Statistic	0.273	95% Percentile Bootstrap UCL	63.82
Kolmogorov-Smirnov 5% Critical Value	0.17	95% BCA Bootstrap UCL	63.31
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	79.55
		97.5% Chebyshev(Mean, Sd) UCL	90.32
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	111.5
95% Approximate Gamma UCL	68.7		
95% Adjusted Gamma UCL	69.72		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	79.55
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0299	Minimum of Log Data	-3.51
Maximum	21.3	Maximum of Log Data	3.059
Mean	9.408	Mean of log Data	1.976
Median		10 SD of log Data	1.194
SD	4.271		
Coefficient of Variation	0.454		
Skewness	0.503		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.769	Shapiro Wilk Test Statistic	0.482
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.81	95% H-UCL	28.22
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30.82
95% Adjusted-CLT UCL (Chen-1995)	10.84	97.5% Chebyshev (MVUE) UCL	38.06
95% Modified-t UCL (Johnson-1978)	10.82	99% Chebyshev (MVUE) UCL	52.27

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.832	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.135		
MLE of Mean	9.408		
MLE of Standard Deviation	6.951		
nu star	98.93		
Approximate Chi Square Value (.05)	76.99	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	10.76
Adjusted Chi Square Value	75.75	95% Jackknife UCL	10.81
		95% Standard Bootstrap UCL	10.75
Anderson-Darling Test Statistic	4.235	95% Bootstrap-t UCL	10.91
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	11.15
Kolmogorov-Smirnov Test Statistic	0.367	95% Percentile Bootstrap UCL	10.83
Kolmogorov-Smirnov 5% Critical Value	0.17	95% BCA Bootstrap UCL	10.75
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.99
		97.5% Chebyshev(Mean, Sd) UCL	14.54
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.59
95% Approximate Gamma UCL	12.09		
95% Adjusted Gamma UCL	12.29		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.99

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	5 Minimum of Log Data	1.609
Maximum	101.7 Maximum of Log Data	4.622
Mean	46.55 Mean of log Data	3.517
Median	65 SD of log Data	0.953
SD	28.4	
Coefficient of Variation	0.61	
Skewness	-0.333	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.749 Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical Value	0.923 Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	55.87	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	83.98
95% Adjusted-CLT UCL (Chen-1995)	55.16	95% Chebyshev (MVUE) UCL	98.66
95% Modified-t UCL (Johnson-1978)	55.81	97.5% Chebyshev (MVUE) UCL	118.9
		99% Chebyshev (MVUE) UCL	158.8

Gamma Distribution Test

k star (bias corrected)	1.528	Data Distribution	
Theta Star	30.46	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	46.55		
MLE of Standard Deviation	37.65		
nu star	82.53		
Approximate Chi Square Value (.05)	62.59	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	55.54
Adjusted Chi Square Value	61.48	95% Jackknife UCL	55.87
		95% Standard Bootstrap UCL	55.43
Anderson-Darling Test Statistic	3.548	95% Bootstrap-t UCL	55.72
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	54.59
Kolmogorov-Smirnov Test Statistic	0.391	95% Percentile Bootstrap UCL	55.26
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	55.29
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	70.37
		97.5% Chebyshev(Mean, Sd) UCL	80.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	100.9
95% Approximate Gamma UCL	61.37		
95% Adjusted Gamma UCL	62.48		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 70.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	27	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.1	Minimum of Log Data	-2.303
Maximum	5	Maximum of Log Data	1.609
Mean	1.408	Mean of log Data	-0.236
Median	1.408	SD of log Data	1.271
SD	1.412		
Coefficient of Variation	1.003		
Skewness	1.812		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.676	Shapiro Wilk Test Statistic	0.79
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.872	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3.643
95% Adjusted-CLT UCL (Chen-1995)	1.957	95% Chebyshev (MVUE) UCL	3.84
95% Modified-t UCL (Johnson-1978)	1.888	97.5% Chebyshev (MVUE) UCL	4.773
		99% Chebyshev (MVUE) UCL	6.605

Gamma Distribution Test

k star (bias corrected)	0.912	Data Distribution	
Theta Star	1.545	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.408		
MLE of Standard Deviation	1.475		
nu star	49.23		
Approximate Chi Square Value (.05)	34.12	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	1.855
Adjusted Chi Square Value	33.32	95% Jackknife UCL	1.872
		95% Standard Bootstrap UCL	1.848
Anderson-Darling Test Statistic	2.29	95% Bootstrap-t UCL	2.06
Anderson-Darling 5% Critical Value	0.773	95% Hall's Bootstrap UCL	1.954
Kolmogorov-Smirnov Test Statistic	0.299	95% Percentile Bootstrap UCL	1.878
Kolmogorov-Smirnov 5% Critical Value	0.173	95% BCA Bootstrap UCL	1.912
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.593
		97.5% Chebyshev(Mean, Sd) UCL	3.105
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.112
95% Approximate Gamma UCL	2.032		
95% Adjusted Gamma UCL	2.081		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.593

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 27 Number of Distinct Observations 5

Raw Statistics	Log-transformed Statistics	
Minimum	0.049	Minimum of Log Data -3.016
Maximum	10.09	Maximum of Log Data 2.312
Mean	7.976	Mean of log Data 1.783
Median		10 SD of log Data 1.229
SD	3.158	
Coefficient of Variation	0.396	
Skewness	-1.32	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.661	Shapiro Wilk Test Statistic 0.468
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value 0.923
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)	9.012	95% H-UCL 25.08
95% Adjusted-CLT UCL (Chen-1995)		95% Chebyshev (MVUE) UCL 26.97
95% Modified-t UCL (Johnson-1978)	8.811	97.5% Chebyshev (MVUE) UCL 33.4
	8.987	99% Chebyshev (MVUE) UCL 46.04

Gamma Distribution Test

k star (bias corrected)	Data Distribution	
Theta Star	1.673	Data do not follow a Discernable Distribution (0.05)
MLE of Mean	4.768	
MLE of Standard Deviation	7.976	
nu star	6.167	
Approximate Chi Square Value (.05)	90.33	
Adjusted Level of Significance	69.42	Nonparametric Statistics
Adjusted Chi Square Value	0.0401	95% CLT UCL 8.975
	68.25	95% Jackknife UCL 9.012
		95% Standard Bootstrap UCL 8.967
Anderson-Darling Test Statistic	5.083	95% Bootstrap-t UCL 8.903
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL 8.82
Kolmogorov-Smirnov Test Statistic	0.38	95% Percentile Bootstrap UCL 8.896
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL 8.896
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 10.62
		97.5% Chebyshev(Mean, Sd) UCL 11.77
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 14.02
95% Approximate Gamma UCL	10.38	
95% Adjusted Gamma UCL	10.56	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 10.62
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

27 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options			
From File	138-02.wst		
Full Precision	OFF		
Confidence Coefficient			95%
Number of Bootstrap Operations			2000
Nickel			
General Statistics			
Number of Valid Observations	20	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	65	Minimum of Log Data	4.174
Maximum	113.2	Maximum of Log Data	4.729
Mean	73.68	Mean of log Data	4.281
Median	65	SD of log Data	0.19
SD	15.95		
Coefficient of Variation	0.217		
Skewness	1.707		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.611	Shapiro Wilk Test Statistic	0.621
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	79.85	95% H-UCL	79.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	87.28
95% Adjusted-CLT UCL (Chen-1995)	81.01	97.5% Chebyshev (MVUE) UCL	93.21
95% Modified-t UCL (Johnson-1978)	80.08	99% Chebyshev (MVUE) UCL	104.9
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	22.85	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.224		
MLE of Mean	73.68		
MLE of Standard Deviation	15.41		
nu star	914		
Approximate Chi Square Value (.05)	844.9	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	79.55
Adjusted Chi Square Value	839.6	95% Jackknife UCL	79.85
		95% Standard Bootstrap UCL	79.38
Anderson-Darling Test Statistic	3.688	95% Bootstrap-t UCL	82.28
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	79.15
Kolmogorov-Smirnov Test Statistic	0.416	95% Percentile Bootstrap UCL	79.86
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	80.44
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	89.23
		97.5% Chebyshev(Mean, Sd) UCL	95.96
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	109.2
95% Approximate Gamma UCL	79.72		
95% Adjusted Gamma UCL	80.21		
Potential UCL to Use		Use 95% Student's-t UCL	79.85
		or 95% Modified-t UCL	80.08

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	4
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Raw Statistics		Log-transformed Statistics	
Minimum	0.092	Minimum of Log Data	-2.386
Maximum		5 Maximum of Log Data	1.609
Mean	4.302	Mean of log Data	1.186
Median		5 SD of log Data	1.154
SD	1.467		
Coefficient of Variation	0.341		
Skewness	-2.642		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.504	Shapiro Wilk Test Statistic	0.4
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	4.87	95% H-UCL	13.59
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.85
95% Adjusted-CLT UCL (Chen-1995)	4.635	97.5% Chebyshev (MVUE) UCL	17.22
95% Modified-t UCL (Johnson-1978)	4.837	99% Chebyshev (MVUE) UCL	23.84

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.716	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.507		
MLE of Mean	4.302		
MLE of Standard Deviation	3.284		
nu star	68.64		
Approximate Chi Square Value (.05)	50.57	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	4.842
Adjusted Chi Square Value	49.35	95% Jackknife UCL	4.87
		95% Standard Bootstrap UCL	4.81
Anderson-Darling Test Statistic	5.655	95% Bootstrap-t UCL	4.706
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	4.691
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	4.791
Kolmogorov-Smirnov 5% Critical Value	0.196	95% BCA Bootstrap UCL	4.686
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.732
		97.5% Chebyshev(Mean, Sd) UCL	6.351
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.566
95% Approximate Gamma UCL	5.84		
95% Adjusted Gamma UCL	5.985		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	5.732
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Silver

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	10	Minimum of Log Data	2.303
Maximum	12.67	Maximum of Log Data	2.539
Mean	10.2	Mean of log Data	2.32
Median	10	SD of log Data	0.0562
SD	0.628		
Coefficient of Variation	0.0616		
Skewness	3.686		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.363	Shapiro Wilk Test Statistic	0.37
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.44	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	10.55	95% Chebyshev (MVUE) UCL	10.75
95% Modified-t UCL (Johnson-1978)	10.46	97.5% Chebyshev (MVUE) UCL	11
		99% Chebyshev (MVUE) UCL	11.47

Gamma Distribution Test

k star (bias corrected)	266.6	Data Distribution	
Theta Star	0.0382	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.2		
MLE of Standard Deviation	0.624		
nu star	10663		
Approximate Chi Square Value (.05)	10424	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	10.43
Adjusted Chi Square Value	10405	95% Jackknife UCL	10.44
		95% Standard Bootstrap UCL	10.42
Anderson-Darling Test Statistic	5.792	95% Bootstrap-t UCL	12.03
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	13.26
Kolmogorov-Smirnov Test Statistic	0.477	95% Percentile Bootstrap UCL	10.46
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	10.53
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.81
		97.5% Chebyshev(Mean, Sd) UCL	11.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.59
95% Approximate Gamma UCL	10.43		
95% Adjusted Gamma UCL	10.45		

Potential UCL to Use
Use 95% Student's-t UCL 10.44
or 95% Modified-t UCL 10.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	3
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Raw Statistics		Log-transformed Statistics	
Minimum	0.0384	Minimum of Log Data	-3.26
Maximum	2.5	Maximum of Log Data	0.916
Mean	1.269	Mean of log Data	0.0974
Median	1.269	SD of log Data	0.805
SD	0.399		
Coefficient of Variation	0.315		
Skewness	#####		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.448	Shapiro Wilk Test Statistic	0.318
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.424	95% H-UCL	2.357
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.762
95% Adjusted-CLT UCL (Chen-1995)	1.416	97.5% Chebyshev (MVUE) UCL	3.312
95% Modified-t UCL (Johnson-1978)	1.424	99% Chebyshev (MVUE) UCL	4.391

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.182	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.399		
MLE of Mean	1.269		
MLE of Standard Deviation	0.712		
nu star	127.3		
Approximate Chi Square Value (.05)	102.2	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	1.416
Adjusted Chi Square Value	100.4	95% Jackknife UCL	1.424
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	6.099	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.519	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.658
		97.5% Chebyshev(Mean, Sd) UCL	1.827
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.158
95% Approximate Gamma UCL	1.58		
95% Adjusted Gamma UCL	1.608		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	1.658
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	180-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.4	Minimum of Log Data	-0.916
Maximum	0.7	Maximum of Log Data	-0.357
Mean	0.56	Mean of log Data	-0.587
Median	0.56	SD of log Data	0.128
SD	0.0675		
Coefficient of Variation	0.121		
Skewness	-0.533		

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.669	Shapiro Wilk Test Statistic	0.646
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.597	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.603
95% Adjusted-CLT UCL (Chen-1995)	0.59	95% Chebyshev (MVUE) UCL	0.655
95% Modified-t UCL (Johnson-1978)	0.596	97.5% Chebyshev (MVUE) UCL	0.695
		99% Chebyshev (MVUE) UCL	0.776

Gamma Distribution Test

k star (bias corrected)	51.31	Data Distribution	
Theta Star	0.0109	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.56		
MLE of Standard Deviation	0.0782		
nu star	1129		
Approximate Chi Square Value (.05)	1052	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.593
Adjusted Chi Square Value	1040	95% Jackknife UCL	0.597
		95% Standard Bootstrap UCL	0.591
Anderson-Darling Test Statistic	2.102	95% Bootstrap-t UCL	0.59
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL	0.598
Kolmogorov-Smirnov Test Statistic	0.425	95% Percentile Bootstrap UCL	0.589
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	0.585
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.649
		97.5% Chebyshev(Mean, Sd) UCL	0.687
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.763
95% Approximate Gamma UCL	0.601		
95% Adjusted Gamma UCL	0.608		

Potential UCL to Use

Use 95% Student's-t UCL	0.597
or 95% Modified-t UCL	0.596

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	5.72	Minimum of Log Data	1.744
Maximum	138	Maximum of Log Data	4.927
Mean	25.31	Mean of log Data	2.72
Median	11.3	SD of log Data	0.89
SD	38.35		
Coefficient of Variation	1.515		
Skewness	3.036		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.519	Shapiro Wilk Test Statistic	0.831
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	46.27	95% H-UCL	49.47
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	48.03
95% Adjusted-CLT UCL (Chen-1995)	55.64	97.5% Chebyshev (MVUE) UCL	59.49
95% Modified-t UCL (Johnson-1978)	48.03	99% Chebyshev (MVUE) UCL	82.01

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.871	Data do not follow a Discernable Distribution (0.05)	
Theta Star	29.06		
MLE of Mean	25.31		
MLE of Standard Deviation	27.12		
nu star	19.16		
Approximate Chi Square Value (.05)	10.24	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	44.33
Adjusted Chi Square Value	9.192	95% Jackknife UCL	46.27
		95% Standard Bootstrap UCL	44.04
Anderson-Darling Test Statistic	1.348	95% Bootstrap-t UCL	142.5
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	114.9
Kolmogorov-Smirnov Test Statistic	0.328	95% Percentile Bootstrap UCL	47
Kolmogorov-Smirnov 5% Critical Value	0.262	95% BCA Bootstrap UCL	59.52
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	75.71
		97.5% Chebyshev(Mean, Sd) UCL	97.52
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	140.4
95% Approximate Gamma UCL	47.39		
95% Adjusted Gamma UCL	52.78		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 75.71

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.54	Minimum of Log Data	-0.616
Maximum	0.69	Maximum of Log Data	-0.371
Mean	0.607	Mean of log Data	-0.501
Median	0.607	SD of log Data	0.0556
SD	0.0342		
Coefficient of Variation	0.0563		
Skewness	0.852		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.687	Shapiro Wilk Test Statistic	0.695
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.625	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.626	95% Chebyshev (MVUE) UCL	0.651
95% Modified-t UCL (Johnson-1978)	0.626	97.5% Chebyshev (MVUE) UCL	0.67
		99% Chebyshev (MVUE) UCL	0.708

Gamma Distribution Test

k star (bias corrected)	257.3	Data Distribution	
Theta Star	0.0024	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.607		
MLE of Standard Deviation	0.0378		
nu star	5661		
Approximate Chi Square Value (.05)	5487	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.624
Adjusted Chi Square Value	5459	95% Jackknife UCL	0.625
		95% Standard Bootstrap UCL	0.623
Anderson-Darling Test Statistic	1.904	95% Bootstrap-t UCL	0.627
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL	0.646
Kolmogorov-Smirnov Test Statistic	0.402	95% Percentile Bootstrap UCL	0.622
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL	0.628
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.652
		97.5% Chebyshev(Mean, Sd) UCL	0.671
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.709
95% Approximate Gamma UCL	0.626		
95% Adjusted Gamma UCL	0.629		

Potential UCL to Use Use 95% Student's-t UCL 0.625
 or 95% Modified-t UCL 0.626

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	37.92	Minimum of Log Data	3.635
Maximum		85 Maximum of Log Data	4.443
Mean	64.11	Mean of log Data	4.125
Median	58.52	SD of log Data	0.283
SD	17.74		
Coefficient of Variation	0.277		
Skewness	0.191		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.853	Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	73.8	95% H-UCL	76.54
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	88.17
95% Adjusted-CLT UCL (Chen-1995)	73.24	97.5% Chebyshev (MVUE) UCL	98.57
95% Modified-t UCL (Johnson-1978)	73.85	99% Chebyshev (MVUE) UCL	119

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	10.34	Data appear Normal at 5% Significance Level	
Theta Star	6.201		
MLE of Mean	64.11		
MLE of Standard Deviation	19.94		
nu star	227.4		
Approximate Chi Square Value (.05)	193.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	72.91
Adjusted Chi Square Value	188.4	95% Jackknife UCL	73.8
		95% Standard Bootstrap UCL	72.69
Anderson-Darling Test Statistic	0.661	95% Bootstrap-t UCL	74.27
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	72.06
Kolmogorov-Smirnov Test Statistic	0.248	95% Percentile Bootstrap UCL	73.02
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	72.73
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.42
		97.5% Chebyshev(Mean, Sd) UCL	97.51
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117.3
95% Approximate Gamma UCL	75.34		
95% Adjusted Gamma UCL	77.38		

Potential UCL to Use		Use 95% Student's-t UCL	73.8
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum		8 Minimum of Log Data	2.079
Maximum		19.6 Maximum of Log Data	2.976
Mean	12.13	Mean of log Data	2.472
Median	12.13	SD of log Data	0.224
SD	2.897		
Coefficient of Variation	0.239		
Skewness	1.551		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.688	Shapiro Wilk Test Statistic	0.739
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.72	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.88
95% Adjusted-CLT UCL (Chen-1995)	14.01	95% Chebyshev (MVUE) UCL	15.71
95% Modified-t UCL (Johnson-1978)	13.78	97.5% Chebyshev (MVUE) UCL	17.26
		99% Chebyshev (MVUE) UCL	20.3

Gamma Distribution Test

k star (bias corrected)	15.68	Data Distribution	
Theta Star	0.774	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	12.13		
MLE of Standard Deviation	3.065		
nu star	344.9		
Approximate Chi Square Value (.05)	302.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	13.57
Adjusted Chi Square Value	296.4	95% Jackknife UCL	13.72
		95% Standard Bootstrap UCL	13.5
Anderson-Darling Test Statistic	1.693	95% Bootstrap-t UCL	14.2
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	21.01
Kolmogorov-Smirnov Test Statistic	0.38	95% Percentile Bootstrap UCL	13.49
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	13.87
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.94
		97.5% Chebyshev(Mean, Sd) UCL	17.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.83
95% Approximate Gamma UCL	13.82		
95% Adjusted Gamma UCL	14.12		

Potential UCL to Use		Use 95% Student's-t UCL	13.72
		or 95% Modified-t UCL	13.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	18.3 Minimum of Log Data	2.907
Maximum	1992 Maximum of Log Data	7.597
Mean	305.4 Mean of log Data	4.371
Median	43.19 SD of log Data	1.587
SD	601.9	
Coefficient of Variation	1.971	
Skewness	2.655	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.558 Shapiro Wilk Test Statistic	0.844
Shapiro Wilk Critical Value	0.85 Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	634.3 95% H-UCL	2324
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	736.9
95% Adjusted-CLT UCL (Chen-1995)	759.2 97.5% Chebyshev (MVUE) UCL	957.4
95% Modified-t UCL (Johnson-1978)	658.6 99% Chebyshev (MVUE) UCL	1391

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.405 Data do not follow a Discernable Distribution (0.05)	
Theta Star	753.3	
MLE of Mean	305.4	
MLE of Standard Deviation	479.6	
nu star	8.919	
Approximate Chi Square Value (.05)	3.278 Nonparametric Statistics	
Adjusted Level of Significance	0.0278 95% CLT UCL	603.9
Adjusted Chi Square Value	2.745 95% Jackknife UCL	634.3
	95% Standard Bootstrap UCL	587.8
Anderson-Darling Test Statistic	1.226 95% Bootstrap-t UCL	2114
Anderson-Darling 5% Critical Value	0.786 95% Hall's Bootstrap UCL	2234
Kolmogorov-Smirnov Test Statistic	0.329 95% Percentile Bootstrap UCL	627.7
Kolmogorov-Smirnov 5% Critical Value	0.27 95% BCA Bootstrap UCL	815.2
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1097
	97.5% Chebyshev(Mean, Sd) UCL	1439
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2111
95% Approximate Gamma UCL	830.9	
95% Adjusted Gamma UCL	992.2	

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 2111

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	259.9 Minimum of Log Data	5.56
Maximum	1332 Maximum of Log Data	7.194
Mean	641.2 Mean of log Data	6.349
Median	535.7 SD of log Data	0.496
SD	333.9	
Coefficient of Variation	0.521	
Skewness	1.096	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.89 Shapiro Wilk Test Statistic	0.97
Shapiro Wilk Critical Value	0.85 Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	823.7 95% H-UCL	909.3
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1064
95% Adjusted-CLT UCL (Chen-1995)	842.4 97.5% Chebyshev (MVUE) UCL	1248
95% Modified-t UCL (Johnson-1978)	829.3 99% Chebyshev (MVUE) UCL	1610

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.365 Data appear Normal at 5% Significance Level	
Theta Star	190.6	
MLE of Mean	641.2	
MLE of Standard Deviation	349.6	
nu star	74.02	
Approximate Chi Square Value (.05)	55.21 Nonparametric Statistics	
Adjusted Level of Significance	0.0278 95% CLT UCL	806.8
Adjusted Chi Square Value	52.57 95% Jackknife UCL	823.7
	95% Standard Bootstrap UCL	799.5
Anderson-Darling Test Statistic	0.302 95% Bootstrap-t UCL	902.9
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	913.1
Kolmogorov-Smirnov Test Statistic	0.181 95% Percentile Bootstrap UCL	805.6
Kolmogorov-Smirnov 5% Critical Value	0.256 95% BCA Bootstrap UCL	826.2
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1080
	97.5% Chebyshev(Mean, Sd) UCL	1270
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1643
95% Approximate Gamma UCL	859.8	
95% Adjusted Gamma UCL	903	

Potential UCL to Use Use 95% Student's-t UCL 823.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0288	Minimum of Log Data	-3.547
Maximum		10 Maximum of Log Data	2.303
Mean	6.816	Mean of log Data	0.736
Median		10 SD of log Data	2.558
SD	4.481		
Coefficient of Variation	0.657		
Skewness	-1		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.687	Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.264	95% H-UCL	10164
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	109.3
95% Adjusted-CLT UCL (Chen-1995)	8.602	97.5% Chebyshev (MVUE) UCL	145.7
95% Modified-t UCL (Johnson-1978)	9.196	99% Chebyshev (MVUE) UCL	217.2

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.447	Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.23		
MLE of Mean	6.816		
MLE of Standard Deviation	10.19		
nu star	9.844		
Approximate Chi Square Value (.05)	3.844	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	9.038
Adjusted Chi Square Value	3.257	95% Jackknife UCL	9.264
		95% Standard Bootstrap UCL	8.924
Anderson-Darling Test Statistic	2.299	95% Bootstrap-t UCL	8.878
Anderson-Darling 5% Critical Value	0.779	95% Hall's Bootstrap UCL	8.48
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL	8.783
Kolmogorov-Smirnov 5% Critical Value	0.269	95% BCA Bootstrap UCL	8.471
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.7
		97.5% Chebyshev(Mean, Sd) UCL	15.25
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.26
95% Approximate Gamma UCL	17.45		
95% Adjusted Gamma UCL	20.6		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 20.26

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	12.2	Minimum of Log Data	2.501
Maximum	90.33	Maximum of Log Data	4.503
Mean	60.6	Mean of log Data	3.945
Median	66.3	SD of log Data	0.704
SD	25.44		
Coefficient of Variation	0.42		
Skewness	-1.319		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.813	Shapiro Wilk Test Statistic	0.666
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	74.5	95% H-UCL	114.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	126.4
95% Adjusted-CLT UCL (Chen-1995)	69.96	97.5% Chebyshev (MVUE) UCL	153.1
95% Modified-t UCL (Johnson-1978)	73.99	99% Chebyshev (MVUE) UCL	205.7

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.465	Data do not follow a Discernable Distribution (0.05)	
Theta Star	24.58		
MLE of Mean	60.6		
MLE of Standard Deviation	38.6		
nu star	54.23		
Approximate Chi Square Value (.05)	38.31	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	73.22
Adjusted Chi Square Value	36.14	95% Jackknife UCL	74.5
		95% Standard Bootstrap UCL	72.91
Anderson-Darling Test Statistic	1.577	95% Bootstrap-t UCL	71.89
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	70.39
Kolmogorov-Smirnov Test Statistic	0.35	95% Percentile Bootstrap UCL	71.87
Kolmogorov-Smirnov 5% Critical Value	0.257	95% BCA Bootstrap UCL	70.43
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.04
		97.5% Chebyshev(Mean, Sd) UCL	108.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	136.9
95% Approximate Gamma UCL	85.78		
95% Adjusted Gamma UCL	90.93		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 94.04

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.033	Minimum of Log Data	-3.411
Maximum	11.68	Maximum of Log Data	2.458
Mean	8.366	Mean of log Data	1.28
Median		10 SD of log Data	2.32
SD	4.15		
Coefficient of Variation	0.496		
Skewness	-1.853		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.571	Shapiro Wilk Test Statistic	0.501
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.63	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4000
95% Adjusted-CLT UCL (Chen-1995)	9.677	95% Chebyshev (MVUE) UCL	120.9
95% Modified-t UCL (Johnson-1978)	10.52	97.5% Chebyshev (MVUE) UCL	160.5
		99% Chebyshev (MVUE) UCL	238.4

Gamma Distribution Test

k star (bias corrected)	0.58	Data Distribution	
Theta Star	14.42	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.366		
MLE of Standard Deviation	10.98		
nu star	12.76		
Approximate Chi Square Value (.05)	5.732	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	10.42
Adjusted Chi Square Value	4.985	95% Jackknife UCL	10.63
		95% Standard Bootstrap UCL	10.38
Anderson-Darling Test Statistic	3.182	95% Bootstrap-t UCL	10.01
Anderson-Darling 5% Critical Value	0.765	95% Hall's Bootstrap UCL	9.768
Kolmogorov-Smirnov Test Statistic	0.527	95% Percentile Bootstrap UCL	10.2
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	10.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.82
		97.5% Chebyshev(Mean, Sd) UCL	16.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.82
95% Approximate Gamma UCL	18.62		
95% Adjusted Gamma UCL	21.42		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 20.82
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	0.16 Minimum of Log Data	-1.833
Maximum	0.75 Maximum of Log Data	-0.288
Mean	0.397 Mean of log Data	-0.981
Median	0.397 SD of log Data	0.363
SD	0.139	
Coefficient of Variation	0.352	
Skewness	1.319	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.701 Shapiro Wilk Test Statistic	0.731
Shapiro Wilk Critical Value	0.85 Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.473	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.505
95% Adjusted-CLT UCL (Chen-1995)	0.484	95% Chebyshev (MVUE) UCL	0.59
95% Modified-t UCL (Johnson-1978)	0.476	97.5% Chebyshev (MVUE) UCL	0.673
		99% Chebyshev (MVUE) UCL	0.836

Gamma Distribution Test

k star (bias corrected)	6.639	Data Distribution	
Theta Star	0.0597	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.397		
MLE of Standard Deviation	0.154		
nu star	146.1		
Approximate Chi Square Value (.05)	119.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.466
Adjusted Chi Square Value	115.2	95% Jackknife UCL	0.473
		95% Standard Bootstrap UCL	0.463
Anderson-Darling Test Statistic	1.69	95% Bootstrap-t UCL	0.478
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	0.882
Kolmogorov-Smirnov Test Statistic	0.365	95% Percentile Bootstrap UCL	0.461
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	0.472
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.58
		97.5% Chebyshev(Mean, Sd) UCL	0.659
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.815
95% Approximate Gamma UCL	0.486		
95% Adjusted Gamma UCL	0.503		

Potential UCL to Use Use 95% Student's-t UCL 0.473
 or 95% Modified-t UCL 0.476

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	180-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	0.25	Minimum of Log Data -1.386
Maximum	0.59	Maximum of Log Data -0.528
Mean	0.42	Mean of log Data -0.882
Median	0.42	SD of log Data 0.186
SD	0.073	
Coefficient of Variation	0.173	
Skewness	0	

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic 0.579
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.458	95% H-UCL 0.467
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.519
95% Adjusted-CLT UCL (Chen-1995)	0.454	97.5% Chebyshev (MVUE) UCL 0.562
95% Modified-t UCL (Johnson-1978)	0.458	99% Chebyshev (MVUE) UCL 0.646

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	25.33	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.017	
MLE of Mean	0.42	
MLE of Standard Deviation	0.084	
nu star	607.9	
Approximate Chi Square Value (.05)	551.7	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 0.454
Adjusted Chi Square Value	543.5	95% Jackknife UCL 0.458
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	2.741	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.44	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.511
		97.5% Chebyshev(Mean, Sd) UCL 0.551
		99% Chebyshev(Mean, Sd) UCL 0.628
Assuming Gamma Distribution		
95% Approximate Gamma UCL	0.463	
95% Adjusted Gamma UCL	0.47	

Potential UCL to Use

Use 95% Student's-t UCL	0.458
or 95% Modified-t UCL	0.458

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

		Log-transformed Statistics	
Minimum	5.99	Minimum of Log Data	1.79
Maximum	18.65	Maximum of Log Data	2.926
Mean	9.747	Mean of log Data	2.226
Median	8.365	SD of log Data	0.32
SD	3.512		
Coefficient of Variation	0.36		
Skewness	1.594		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.852	Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	11.57	95% H-UCL	11.77
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.67
95% Adjusted-CLT UCL (Chen-1995)	11.91	97.5% Chebyshev (MVUE) UCL	15.38
95% Modified-t UCL (Johnson-1978)	11.65	99% Chebyshev (MVUE) UCL	18.74

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	7.615	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.28		
MLE of Mean	9.747		
MLE of Standard Deviation	3.532		
nu star	182.8		
Approximate Chi Square Value (.05)	152.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.41
Adjusted Chi Square Value	148.3	95% Jackknife UCL	11.57
		95% Standard Bootstrap UCL	11.31
Anderson-Darling Test Statistic	0.429	95% Bootstrap-t UCL	12.69
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	19.25
Kolmogorov-Smirnov Test Statistic	0.192	95% Percentile Bootstrap UCL	11.42
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.77
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.17
		97.5% Chebyshev(Mean, Sd) UCL	16.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.84
95% Approximate Gamma UCL	11.68		
95% Adjusted Gamma UCL	12.01		

Potential UCL to Use		Use 95% Approximate Gamma UCL	11.68
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

		Log-transformed Statistics	
Minimum	36.22	Minimum of Log Data	3.59
Maximum	85	Maximum of Log Data	4.443
Mean	55.56	Mean of log Data	3.963
Median	52.15	SD of log Data	0.339
SD	19.57		
Coefficient of Variation	0.352		
Skewness	0.709		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.825	Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	65.7	95% H-UCL	68.12
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	79.37
95% Adjusted-CLT UCL (Chen-1995)	66.08	97.5% Chebyshev (MVUE) UCL	89.71
95% Modified-t UCL (Johnson-1978)	65.89	99% Chebyshev (MVUE) UCL	110

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	7.129	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	7.792		
MLE of Mean	55.56		
MLE of Standard Deviation	20.81		
nu star	171.1		
Approximate Chi Square Value (.05)	141.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	64.85
Adjusted Chi Square Value	137.8	95% Jackknife UCL	65.7
		95% Standard Bootstrap UCL	64.23
Anderson-Darling Test Statistic	0.713	95% Bootstrap-t UCL	67.91
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	63.84
Kolmogorov-Smirnov Test Statistic	0.2	95% Percentile Bootstrap UCL	65.37
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	65.18
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.18
		97.5% Chebyshev(Mean, Sd) UCL	90.83
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	111.8
95% Approximate Gamma UCL	67.01		
95% Adjusted Gamma UCL	68.99		

Potential UCL to Use		Use 95% Approximate Gamma UCL	67.01
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	77.89	Minimum of Log Data	4.355
Maximum	1649	Maximum of Log Data	7.408
Mean	400.8	Mean of log Data	5.598
Median	267.8	SD of log Data	0.893
SD	438.1		
Coefficient of Variation	1.093		
Skewness	2.426		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.707	Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	627.9	95% H-UCL	837.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	844
95% Adjusted-CLT UCL (Chen-1995)	703.4	97.5% Chebyshev (MVUE) UCL	1043
95% Modified-t UCL (Johnson-1978)	642.7	99% Chebyshev (MVUE) UCL	1433

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.112	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	360.6		
MLE of Mean	400.8		
MLE of Standard Deviation	380.2		
nu star	26.68		

Approximate Chi Square Value (.05)

	15.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	608.8
Adjusted Chi Square Value	14.65	95% Jackknife UCL	627.9

Anderson-Darling Test Statistic

	0.383	95% Standard Bootstrap UCL	597.7
Anderson-Darling 5% Critical Value	0.748	95% Bootstrap-t UCL	976.3
Kolmogorov-Smirnov Test Statistic	0.151	95% Hall's Bootstrap UCL	1525
Kolmogorov-Smirnov 5% Critical Value	0.25	95% Percentile Bootstrap UCL	624.3
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	696.3

Assuming Gamma Distribution

		95% Chebyshev(Mean, Sd) UCL	952
		97.5% Chebyshev(Mean, Sd) UCL	1191
		99% Chebyshev(Mean, Sd) UCL	1659
95% Approximate Gamma UCL	672.4		
95% Adjusted Gamma UCL	730.1		

Potential UCL to Use

Use 95% Approximate Gamma UCL 672.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.023	Minimum of Log Data	-3.777
Maximum		10 Maximum of Log Data	2.303
Mean	9.023	Mean of log Data	1.78
Median		10 SD of log Data	1.751
SD	2.879		
Coefficient of Variation	0.319		
Skewness	-3.29		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.401	Shapiro Wilk Test Statistic	0.341
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.52	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	283.6
95% Adjusted-CLT UCL (Chen-1995)	9.545	95% Chebyshev (MVUE) UCL	72.87
95% Modified-t UCL (Johnson-1978)	10.38	97.5% Chebyshev (MVUE) UCL	95.15
		99% Chebyshev (MVUE) UCL	138.9

Gamma Distribution Test

k star (bias corrected)	1.055	Data Distribution	
Theta Star	8.549	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.023		
MLE of Standard Deviation	8.783		
nu star	25.33		
Approximate Chi Square Value (.05)	14.86	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.39
Adjusted Chi Square Value	13.65	95% Jackknife UCL	10.52

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.12	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.749	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.493	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	12.64
		97.5% Chebyshev(Mean, Sd) UCL	14.21
		99% Chebyshev(Mean, Sd) UCL	17.29

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.38
95% Adjusted Gamma UCL	16.74

Potential UCL to Use

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	17.29
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	10.7	Minimum of Log Data	2.37
Maximum	86.36	Maximum of Log Data	4.459
Mean	59.75	Mean of log Data	3.926
Median	65	SD of log Data	0.724
SD	24.69		
Coefficient of Variation	0.413		
Skewness	-1.34		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.78	Shapiro Wilk Test Statistic	0.629
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	72.55	95% H-UCL	112.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	125.4
95% Adjusted-CLT UCL (Chen-1995)	68.53	97.5% Chebyshev (MVUE) UCL	151.8
95% Modified-t UCL (Johnson-1978)	72.09	99% Chebyshev (MVUE) UCL	203.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.463	Data do not follow a Discernable Distribution (0.05)	
Theta Star	24.26		
MLE of Mean	59.75		
MLE of Standard Deviation	38.08		
nu star	59.1		
Approximate Chi Square Value (.05)	42.43	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	71.47
Adjusted Chi Square Value	40.28	95% Jackknife UCL	72.55
		95% Standard Bootstrap UCL	71.22
Anderson-Darling Test Statistic	1.897	95% Bootstrap-t UCL	69.68
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	69.01
Kolmogorov-Smirnov Test Statistic	0.39	95% Percentile Bootstrap UCL	70.23
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	69.55
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	90.82
		97.5% Chebyshev(Mean, Sd) UCL	104.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	130.7
95% Approximate Gamma UCL	83.24		
95% Adjusted Gamma UCL	87.68		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 90.82

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	180-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	7.14	Minimum of Log Data	1.966
Maximum	30.3	Maximum of Log Data	3.411
Mean	11.42	Mean of log Data	2.376
Median	11	SD of log Data	0.32
SD	5.156		
Coefficient of Variation	0.452		
Skewness	3.363		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.572	Shapiro Wilk Test Statistic	0.775
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.16
95% Adjusted-CLT UCL (Chen-1995)	14.57	95% Chebyshev (MVUE) UCL	15.16
95% Modified-t UCL (Johnson-1978)	13.77	97.5% Chebyshev (MVUE) UCL	16.83
		99% Chebyshev (MVUE) UCL	20.12

Gamma Distribution Test

k star (bias corrected)	7.116	Data Distribution	
Theta Star	1.605	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.42		
MLE of Standard Deviation	4.281		
nu star	241.9		
Approximate Chi Square Value (.05)	206.9	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	13.48
Adjusted Chi Square Value	203.5	95% Jackknife UCL	13.6
		95% Standard Bootstrap UCL	13.41
Anderson-Darling Test Statistic	1.613	95% Bootstrap-t UCL	16.29
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	22.32
Kolmogorov-Smirnov Test Statistic	0.263	95% Percentile Bootstrap UCL	13.84
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	14.94
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.87
		97.5% Chebyshev(Mean, Sd) UCL	19.23
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	23.86
95% Approximate Gamma UCL	13.35		
95% Adjusted Gamma UCL	13.57		

Potential UCL to Use

Use 95% Student's-t UCL	13.6
or 95% Modified-t UCL	13.77

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.22	Minimum of Log Data	-1.514
Maximum	0.7	Maximum of Log Data	-0.357
Mean	0.467	Mean of log Data	-0.781
Median	0.467	SD of log Data	0.213
SD	0.085		
Coefficient of Variation	0.182		
Skewness	-0.27		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.511	Shapiro Wilk Test Statistic	0.471
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.503	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.516
95% Adjusted-CLT UCL (Chen-1995)	0.499	95% Chebyshev (MVUE) UCL	0.574
95% Modified-t UCL (Johnson-1978)	0.502	97.5% Chebyshev (MVUE) UCL	0.62
		99% Chebyshev (MVUE) UCL	0.71

Gamma Distribution Test

k star (bias corrected)	22.16	Data Distribution	
Theta Star	0.021	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.467		
MLE of Standard Deviation	0.099		
nu star	753.6		
Approximate Chi Square Value (.05)	690.9	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	0.501
Adjusted Chi Square Value	684.6	95% Jackknife UCL	0.503
		95% Standard Bootstrap UCL	0.5
Anderson-Darling Test Statistic	4.426	95% Bootstrap-t UCL	0.497
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	0.507
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	0.496
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	0.495
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.556
		97.5% Chebyshev(Mean, Sd) UCL	0.595
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.672
95% Approximate Gamma UCL	0.509		
95% Adjusted Gamma UCL	0.514		

Potential UCL to Use Use 95% Student's-t UCL 0.503
 or 95% Modified-t UCL 0.502

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	7.7	Minimum of Log Data	2.041
Maximum	85	Maximum of Log Data	4.443
Mean	58.02	Mean of log Data	3.949
Median	49.42	SD of log Data	0.575
SD	22.79		
Coefficient of Variation	0.393		
Skewness	-0.17		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.832	Shapiro Wilk Test Statistic	0.7
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.67	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	82.94
95% Adjusted-CLT UCL (Chen-1995)	66.87	95% Chebyshev (MVUE) UCL	98.9
95% Modified-t UCL (Johnson-1978)	67.63	97.5% Chebyshev (MVUE) UCL	115.5
		99% Chebyshev (MVUE) UCL	148.1

Gamma Distribution Test

k star (bias corrected)	3.851	Data Distribution	
Theta Star	15.07	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.02		
MLE of Standard Deviation	29.57		
nu star	130.9		
Approximate Chi Square Value (.05)	105.5	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	67.12
Adjusted Chi Square Value	103.1	95% Jackknife UCL	67.67
		95% Standard Bootstrap UCL	66.88
Anderson-Darling Test Statistic	1.304	95% Bootstrap-t UCL	67.6
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	66.47
Kolmogorov-Smirnov Test Statistic	0.215	95% Percentile Bootstrap UCL	66.76
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	66.92
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	82.12
		97.5% Chebyshev(Mean, Sd) UCL	92.54
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	113
95% Approximate Gamma UCL	72.01		
95% Adjusted Gamma UCL	73.68		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	82.12
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	149.8	Minimum of Log Data	5.009
Maximum	1002	Maximum of Log Data	6.91
Mean	410.2	Mean of log Data	5.9
Median	343	SD of log Data	0.495
SD	215.5		
Coefficient of Variation	0.525		
Skewness	1.37		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Test Statistic	0.987
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	501.5	95% H-UCL	530.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	630.2
95% Adjusted-CLT UCL (Chen-1995)	514.8	97.5% Chebyshev (MVUE) UCL	725.8
95% Modified-t UCL (Johnson-1978)	504.4	99% Chebyshev (MVUE) UCL	913.7

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.686	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	111.3		
MLE of Mean	410.2		
MLE of Standard Deviation	213.7		
nu star	125.3		
Approximate Chi Square Value (.05)	100.5	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	496.2
Adjusted Chi Square Value	98.13	95% Jackknife UCL	501.5
		95% Standard Bootstrap UCL	495
Anderson-Darling Test Statistic	0.241	95% Bootstrap-t UCL	532.7
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	555.7
Kolmogorov-Smirnov Test Statistic	0.145	95% Percentile Bootstrap UCL	496.5
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	508.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	638.1
		97.5% Chebyshev(Mean, Sd) UCL	736.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	930.3
95% Approximate Gamma UCL	511.7		
95% Adjusted Gamma UCL	523.9		

Potential UCL to Use Use 95% Approximate Gamma UCL 511.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	12.9 Minimum of Log Data	2.557
Maximum	107.9 Maximum of Log Data	4.681
Mean	64.37 Mean of log Data	4.106
Median	65 SD of log Data	0.422
SD	17.29	
Coefficient of Variation	0.269	
Skewness	-0.74	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.648 Shapiro Wilk Test Statistic	0.494
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	71.68 95% H-UCL	81.61
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	96.13
95% Adjusted-CLT UCL (Chen-1995)	70.46 97.5% Chebyshev (MVUE) UCL	109.2
95% Modified-t UCL (Johnson-1978)	71.56 99% Chebyshev (MVUE) UCL	134.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.2 Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.94	
MLE of Mean	64.37	
MLE of Standard Deviation	23.99	
nu star	244.8	
Approximate Chi Square Value (.05)	209.6 Nonparametric Statistics	
Adjusted Level of Significance	0.035 95% CLT UCL	71.26
Adjusted Chi Square Value	206.2 95% Jackknife UCL	71.68
	95% Standard Bootstrap UCL	71.06
Anderson-Darling Test Statistic	3.459 95% Bootstrap-t UCL	70.65
Anderson-Darling 5% Critical Value	0.74 95% Hall's Bootstrap UCL	71.75
Kolmogorov-Smirnov Test Statistic	0.405 95% Percentile Bootstrap UCL	70.56
Kolmogorov-Smirnov 5% Critical Value	0.209 95% BCA Bootstrap UCL	70.34
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	82.64
	97.5% Chebyshev(Mean, Sd) UCL	90.55
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	106.1
95% Approximate Gamma UCL	75.18	
95% Adjusted Gamma UCL	76.43	

Potential UCL to Use

Use 95% Student's-t UCL 71.68
or 95% Modified-t UCL 71.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.028	Minimum of Log Data	-3.576
Maximum	11.4	Maximum of Log Data	2.434
Mean	9.55	Mean of log Data	1.97
Median	10	SD of log Data	1.429
SD	2.48		
Coefficient of Variation	0.26		
Skewness	-3.97		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.357	Shapiro Wilk Test Statistic	0.278
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	10.6	95% H-UCL	66.23
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	49.29
95% Adjusted-CLT UCL (Chen-1995)	9.921	97.5% Chebyshev (MVUE) UCL	62.87
95% Modified-t UCL (Johnson-1978)	10.5	99% Chebyshev (MVUE) UCL	89.54

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.599	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.974		
MLE of Mean	9.55		
MLE of Standard Deviation	7.554		
nu star	54.35		
Approximate Chi Square Value (.05)	38.41	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	10.54
Adjusted Chi Square Value	37.01	95% Jackknife UCL	10.6
		95% Standard Bootstrap UCL	10.48
Anderson-Darling Test Statistic	5.999	95% Bootstrap-t UCL	10.3
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	10.14
Kolmogorov-Smirnov Test Statistic	0.562	95% Percentile Bootstrap UCL	10.24
Kolmogorov-Smirnov 5% Critical Value	0.212	95% BCA Bootstrap UCL	10.19
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.17
		97.5% Chebyshev(Mean, Sd) UCL	13.31
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.54
95% Approximate Gamma UCL	13.51		
95% Adjusted Gamma UCL	14.03		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.17

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	14.9 Minimum of Log Data	2.701
Maximum	40.5 Maximum of Log Data	3.701
Mean	26.73 Mean of log Data	3.272
Median	26.73 SD of log Data	0.18
SD	4.564	
Coefficient of Variation	0.171	
Skewness	0.704	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.535 Shapiro Wilk Test Statistic	0.526
Shapiro Wilk Critical Value	0.892 Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	28.67	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	29.01
95% Adjusted-CLT UCL (Chen-1995)	28.76	95% Chebyshev (MVUE) UCL	31.86
95% Modified-t UCL (Johnson-1978)	28.7	97.5% Chebyshev (MVUE) UCL	34.07
		99% Chebyshev (MVUE) UCL	38.41

Gamma Distribution Test

	Data Distribution		
k star (bias corrected)	28.84	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.927		
MLE of Mean	26.73		
MLE of Standard Deviation	4.978		
nu star	980.5		
Approximate Chi Square Value (.05)	908.8	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	28.55
Adjusted Chi Square Value	901.6	95% Jackknife UCL	28.67
		95% Standard Bootstrap UCL	28.47
Anderson-Darling Test Statistic	4.084	95% Bootstrap-t UCL	28.78
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	30.06
Kolmogorov-Smirnov Test Statistic	0.419	95% Percentile Bootstrap UCL	28.47
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	28.35
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	31.56
		97.5% Chebyshev(Mean, Sd) UCL	33.65
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	37.75
95% Approximate Gamma UCL	28.84		
95% Adjusted Gamma UCL	29.07		

Potential UCL to Use Use 95% Student's-t UCL 28.67
 or 95% Modified-t UCL 28.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	180-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	9
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Raw Statistics

Minimum	5.65	Log-transformed Statistics	
Maximum	19.2	Minimum of Log Data	1.732
Mean	9.454	Maximum of Log Data	2.955
Median	11	Mean of log Data	2.187
SD	3.56	SD of log Data	0.352
Coefficient of Variation	0.377		
Skewness	1.339		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.857
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.07	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.35
95% Adjusted-CLT UCL (Chen-1995)	11.31	95% Chebyshev (MVUE) UCL	13.23
95% Modified-t UCL (Johnson-1978)	11.13	97.5% Chebyshev (MVUE) UCL	14.87
		99% Chebyshev (MVUE) UCL	18.09

Gamma Distribution Test

k star (bias corrected)	6.887	Data Distribution	
Theta Star	1.373	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.454		
MLE of Standard Deviation	3.602		
nu star	206.6		
Approximate Chi Square Value (.05)	174.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.97
Adjusted Chi Square Value	170.7	95% Jackknife UCL	11.07
		95% Standard Bootstrap UCL	10.91
Anderson-Darling Test Statistic	1.057	95% Bootstrap-t UCL	11.42
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	12.09
Kolmogorov-Smirnov Test Statistic	0.248	95% Percentile Bootstrap UCL	10.99
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	11.19
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.46
		97.5% Chebyshev(Mean, Sd) UCL	15.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.6
95% Approximate Gamma UCL	11.2		
95% Adjusted Gamma UCL	11.44		

Potential UCL to Use

		Use 95% Student's-t UCL	11.07
		or 95% Modified-t UCL	11.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	91 Minimum of Log Data	4.511
Maximum	213 Maximum of Log Data	5.361
Mean	152 Mean of log Data	5.012
Median	152 SD of log Data	0.164
SD	23.06	
Coefficient of Variation	0.152	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53 Shapiro Wilk Test Statistic	0.512
Shapiro Wilk Critical Value	0.881 Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	162.5 95% H-UCL	164.6
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	180.2
95% Adjusted-CLT UCL (Chen-1995)	161.8 97.5% Chebyshev (MVUE) UCL	192.4
95% Modified-t UCL (Johnson-1978)	162.5 99% Chebyshev (MVUE) UCL	216.3

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	34.34 Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.426	
MLE of Mean	152	
MLE of Standard Deviation	25.94	
nu star	1030	
Approximate Chi Square Value (.05)	956.8 Nonparametric Statistics	
Adjusted Level of Significance	0.0324 95% CLT UCL	161.8
Adjusted Chi Square Value	948.1 95% Jackknife UCL	162.5
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.83 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.734 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.454 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	177.9
	97.5% Chebyshev(Mean, Sd) UCL	189.2
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	211.2
95% Approximate Gamma UCL	163.7	
95% Adjusted Gamma UCL	165.2	

Potential UCL to Use

Use 95% Student's-t UCL	162.5
or 95% Modified-t UCL	162.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.49	Minimum of Log Data	-0.713
Maximum	1.6	Maximum of Log Data	0.47
Mean	1.045	Mean of log Data	0.0219
Median	1.045	SD of log Data	0.231
SD	0.21		
Coefficient of Variation	0.201		
Skewness	1.74E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.497
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.14	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.175
95% Adjusted-CLT UCL (Chen-1995)	1.134	95% Chebyshev (MVUE) UCL	1.322
95% Modified-t UCL (Johnson-1978)	1.14	97.5% Chebyshev (MVUE) UCL	1.441
		99% Chebyshev (MVUE) UCL	1.674

Gamma Distribution Test

k star (bias corrected)	18.28	Data Distribution	
Theta Star	0.0572	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.045		
MLE of Standard Deviation	0.244		
nu star	548.5		
Approximate Chi Square Value (.05)	495.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	1.134
Adjusted Chi Square Value	488.9	95% Jackknife UCL	1.14
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.853	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.461	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.281
		97.5% Chebyshev(Mean, Sd) UCL	1.383
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.584
95% Approximate Gamma UCL	1.158		
95% Adjusted Gamma UCL	1.172		

Potential UCL to Use
 Use 95% Student's-t UCL 1.14
 or 95% Modified-t UCL 1.14

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	12
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Raw Statistics

		Log-transformed Statistics	
Minimum	34.03	Minimum of Log Data	3.527
Maximum	85	Maximum of Log Data	4.443
Mean	55.2	Mean of log Data	3.954
Median	45.26	SD of log Data	0.344
SD	20.02		
Coefficient of Variation	0.363		
Skewness	0.734		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.804	Shapiro Wilk Test Statistic	0.852
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.31	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	66
95% Adjusted-CLT UCL (Chen-1995)	64.75	95% Chebyshev (MVUE) UCL	76.75
95% Modified-t UCL (Johnson-1978)	64.47	97.5% Chebyshev (MVUE) UCL	86.13
		99% Chebyshev (MVUE) UCL	104.6

Gamma Distribution Test

k star (bias corrected)	7.144	Data Distribution	
Theta Star	7.727	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	55.2		
MLE of Standard Deviation	20.65		
nu star	214.3		
Approximate Chi Square Value (.05)	181.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	63.71
Adjusted Chi Square Value	177.7	95% Jackknife UCL	64.31
		95% Standard Bootstrap UCL	63.24
Anderson-Darling Test Statistic	1.026	95% Bootstrap-t UCL	65.93
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	62.92
Kolmogorov-Smirnov Test Statistic	0.21	95% Percentile Bootstrap UCL	63.83
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	64.3
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	77.74
		97.5% Chebyshev(Mean, Sd) UCL	87.49
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.6
95% Approximate Gamma UCL	65.21		
95% Adjusted Gamma UCL	66.57		

Potential UCL to Use

Use 95% Approximate Gamma UCL	65.21
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	4.7	Minimum of Log Data	1.548
Maximum	13.2	Maximum of Log Data	2.58
Mean	8.95	Mean of log Data	2.175
Median	8.95	SD of log Data	0.2
SD	1.606		
Coefficient of Variation	0.179		
Skewness	-2.83E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.504
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.681	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.89
95% Adjusted-CLT UCL (Chen-1995)	9.632	95% Chebyshev (MVUE) UCL	11
95% Modified-t UCL (Johnson-1978)	9.681	97.5% Chebyshev (MVUE) UCL	11.87
		99% Chebyshev (MVUE) UCL	13.6

Gamma Distribution Test

k star (bias corrected)	23.66	Data Distribution	
Theta Star	0.378	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.95		
MLE of Standard Deviation	1.84		
nu star	709.7		
Approximate Chi Square Value (.05)	648.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	9.632
Adjusted Chi Square Value	641.8	95% Jackknife UCL	9.681
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.842	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.458	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.76
		97.5% Chebyshev(Mean, Sd) UCL	11.54
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.08
95% Approximate Gamma UCL	9.789		
95% Adjusted Gamma UCL	9.898		

Potential UCL to Use		Use 95% Student's-t UCL	9.681
		or 95% Modified-t UCL	9.681

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	15
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Raw Statistics

Minimum	6869	Log-transformed Statistics	
Maximum	35300	Minimum of Log Data	8.835
Mean	12772	Maximum of Log Data	10.47
Median	12479	Mean of log Data	9.348
SD	7179	SD of log Data	0.451
Coefficient of Variation	0.562		
Skewness	2.375		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.734	Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16037	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16199
95% Adjusted-CLT UCL (Chen-1995)	17035	95% Chebyshev (MVUE) UCL	19168
95% Modified-t UCL (Johnson-1978)	16226	97.5% Chebyshev (MVUE) UCL	22005
		99% Chebyshev (MVUE) UCL	27578

Gamma Distribution Test

k star (bias corrected)	3.914	Data Distribution	
Theta Star	3263	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	12772		
MLE of Standard Deviation	6456		
nu star	117.4		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0324	Nonparametric Statistics	
Adjusted Chi Square Value	90.77	95% CLT UCL	15821
		95% Jackknife UCL	16037
		95% Standard Bootstrap UCL	15765
Anderson-Darling Test Statistic	0.658	95% Bootstrap-t UCL	18633
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	29645
Kolmogorov-Smirnov Test Statistic	0.155	95% Percentile Bootstrap UCL	15966
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	17726
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20851
		97.5% Chebyshev(Mean, Sd) UCL	24347
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	31214
95% Approximate Gamma UCL	16057		
95% Adjusted Gamma UCL	16523		

Potential UCL to Use

Use 95% Approximate Gamma UCL	16057
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	317.4	Minimum of Log Data	5.76
Maximum	1990	Maximum of Log Data	7.596
Mean	618	Mean of log Data	6.305
Median	450.3	SD of log Data	0.453
SD	412.1		
Coefficient of Variation	0.667		
Skewness	2.984		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.612	Shapiro Wilk Test Statistic	0.823
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	805.4	95% H-UCL	774.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	916.3
95% Adjusted-CLT UCL (Chen-1995)	880.6	97.5% Chebyshev (MVUE) UCL	1052
95% Modified-t UCL (Johnson-1978)	819	99% Chebyshev (MVUE) UCL	1320

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.457	Data do not follow a Discernable Distribution (0.05)	
Theta Star	178.8		
MLE of Mean	618		
MLE of Standard Deviation	332.4		
nu star	103.7		
Approximate Chi Square Value (.05)	81.21	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	793
Adjusted Chi Square Value	78.76	95% Jackknife UCL	805.4
		95% Standard Bootstrap UCL	786.3
Anderson-Darling Test Statistic	1.347	95% Bootstrap-t UCL	1102
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	1448
Kolmogorov-Smirnov Test Statistic	0.236	95% Percentile Bootstrap UCL	816.5
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	915.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1082
		97.5% Chebyshev(Mean, Sd) UCL	1282
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1677
95% Approximate Gamma UCL	789.2		
95% Adjusted Gamma UCL	813.7		

Potential UCL to Use

Use 95% Student's-t UCL 805.4
or 95% Modified-t UCL 819

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.0197	Minimum of Log Data	-3.927
Maximum		10 Maximum of Log Data	2.303
Mean	8.463	Mean of log Data	1.489
Median		10 SD of log Data	2.076
SD	3.516		
Coefficient of Variation	0.415		
Skewness	-2.2		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.49	Shapiro Wilk Test Statistic	0.44
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.06	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	523.2
95% Adjusted-CLT UCL (Chen-1995)	9.406	95% Chebyshev (MVUE) UCL	100.1
95% Modified-t UCL (Johnson-1978)	9.976	97.5% Chebyshev (MVUE) UCL	131.7
		99% Chebyshev (MVUE) UCL	193.7

Gamma Distribution Test

k star (bias corrected)	0.768	Data Distribution	
Theta Star	11.03	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.463		
MLE of Standard Deviation	9.66		
nu star	23.03		
Approximate Chi Square Value (.05)	13.11	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	9.957
Adjusted Chi Square Value	12.2	95% Jackknife UCL	10.06
		95% Standard Bootstrap UCL	9.881
Anderson-Darling Test Statistic	4.622	95% Bootstrap-t UCL	9.754
Anderson-Darling 5% Critical Value	0.768	95% Hall's Bootstrap UCL	9.527
Kolmogorov-Smirnov Test Statistic	0.496	95% Percentile Bootstrap UCL	9.585
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	9.336
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.42
		97.5% Chebyshev(Mean, Sd) UCL	14.13
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.5
95% Approximate Gamma UCL	14.86		
95% Adjusted Gamma UCL	15.98		

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	17.5
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 9

Raw Statistics

Minimum	10.2	Log-transformed Statistics	
Maximum	90.24	Minimum of Log Data	2.322
Mean	62.41	Maximum of Log Data	4.502
Median	65	Mean of log Data	4.061
SD	16.38	SD of log Data	0.493
Coefficient of Variation	0.262		
Skewness	-2.239		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.652	Shapiro Wilk Test Statistic	0.461
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	85.99
95% Adjusted-CLT UCL (Chen-1995)	66.75	95% Chebyshev (MVUE) UCL	102.1
95% Modified-t UCL (Johnson-1978)	69.45	97.5% Chebyshev (MVUE) UCL	118.1
		99% Chebyshev (MVUE) UCL	149.6

Gamma Distribution Test

k star (bias corrected)	5.713	Data Distribution	
Theta Star	10.92	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	62.41		
MLE of Standard Deviation	26.11		
nu star	171.4		
Approximate Chi Square Value (.05)	142.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	69.36
Adjusted Chi Square Value	138.8	95% Jackknife UCL	69.85
		95% Standard Bootstrap UCL	69.12
Anderson-Darling Test Statistic	3.165	95% Bootstrap-t UCL	67.81
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	67.85
Kolmogorov-Smirnov Test Statistic	0.382	95% Percentile Bootstrap UCL	68.01
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	67.32
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.84
		97.5% Chebyshev(Mean, Sd) UCL	88.82
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.5
95% Approximate Gamma UCL	75.26		
95% Adjusted Gamma UCL	77.04		

Potential UCL to Use

Use 95% Student's-t UCL 69.85
or 95% Modified-t UCL 69.45

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	11.61	Maximum of Log Data	2.452
Mean	8.757	Mean of log Data	1.54
Median	10	SD of log Data	2.036
SD	3.568		
Coefficient of Variation	0.408		
Skewness	-2.328		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.489	Shapiro Wilk Test Statistic	0.427
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.38	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	462
95% Adjusted-CLT UCL (Chen-1995)	9.681	95% Chebyshev (MVUE) UCL	97.57
95% Modified-t UCL (Johnson-1978)	10.29	97.5% Chebyshev (MVUE) UCL	128.2
		99% Chebyshev (MVUE) UCL	188.3

Gamma Distribution Test

k star (bias corrected)	0.785	Data Distribution	
Theta Star	11.16	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.757		
MLE of Standard Deviation	9.886		
nu star	23.54		
Approximate Chi Square Value (.05)	13.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.27
Adjusted Chi Square Value	12.57	95% Jackknife UCL	10.38
		95% Standard Bootstrap UCL	10.25
Anderson-Darling Test Statistic	4.809	95% Bootstrap-t UCL	9.883
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	9.769
Kolmogorov-Smirnov Test Statistic	0.539	95% Percentile Bootstrap UCL	10.09
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	9.957
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.77
		97.5% Chebyshev(Mean, Sd) UCL	14.51
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.92
95% Approximate Gamma UCL	15.27		
95% Adjusted Gamma UCL	16.4		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 17.92

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.0078	Minimum of Log Data -4.854
Maximum	0.0215	Maximum of Log Data -3.84
Mean	0.0147	Mean of log Data -4.24
Median	0.0147	SD of log Data 0.196
SD	0.00259	
Coefficient of Variation	0.177	
Skewness	1.26E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic 0.505
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value 0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0158	Assuming Lognormal Distribution	95% H-UCL 0.0162
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0179
95% Adjusted-CLT UCL (Chen-1995)	0.0157	97.5% Chebyshev (MVUE) UCL	0.0193
95% Modified-t UCL (Johnson-1978)	0.0158	99% Chebyshev (MVUE) UCL	0.0221

Gamma Distribution Test

k star (bias corrected)	24.5	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	5.98E-04		
MLE of Mean	0.0147		
MLE of Standard Deviation	0.00296		
nu star	734.9		
Approximate Chi Square Value (.05)	673	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.0157
Adjusted Chi Square Value	665.7	95% Jackknife UCL	0.0158
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.841	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0176
		97.5% Chebyshev(Mean, Sd) UCL	0.0188
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0213
95% Approximate Gamma UCL	0.016		
95% Adjusted Gamma UCL	0.0162		

Potential UCL to Use Use 95% Student's-t UCL 0.0158
 or 95% Modified-t UCL 0.0158

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	15.9	Minimum of Log Data	2.766
Maximum	48.5	Maximum of Log Data	3.882
Mean	32.2	Mean of log Data	3.452
Median	32.2	SD of log Data	0.217
SD	6.161		
Coefficient of Variation	0.191		
Skewness	1.92E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.5
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	35	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	35.92
95% Adjusted-CLT UCL (Chen-1995)	34.82	95% Chebyshev (MVUE) UCL	40.21
95% Modified-t UCL (Johnson-1978)	35	97.5% Chebyshev (MVUE) UCL	43.64
		99% Chebyshev (MVUE) UCL	50.38

Gamma Distribution Test

k star (bias corrected)	20.44	Data Distribution	
Theta Star	1.575	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	32.2		
MLE of Standard Deviation	7.122		
nu star	613.3		
Approximate Chi Square Value (.05)	556.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	34.82
Adjusted Chi Square Value	550.2	95% Jackknife UCL	35
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.848	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.46	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.13
		97.5% Chebyshev(Mean, Sd) UCL	42.13
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	48.03
95% Approximate Gamma UCL	35.46		
95% Adjusted Gamma UCL	35.89		

Potential UCL to Use
 Use 95% Student's-t UCL 35
 or 95% Modified-t UCL 35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options		
From File	180-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	6.68	Minimum of Log Data	1.899
Maximum	138	Maximum of Log Data	4.927
Mean	24.04	Mean of log Data	2.645
Median	11	SD of log Data	0.874
SD	38.62		
Coefficient of Variation	1.606		
Skewness	3.086		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.471	Shapiro Wilk Test Statistic	0.695
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	45.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	44.32
95% Adjusted-CLT UCL (Chen-1995)	54.77	95% Chebyshev (MVUE) UCL	43.6
95% Modified-t UCL (Johnson-1978)	46.95	97.5% Chebyshev (MVUE) UCL	53.92
		99% Chebyshev (MVUE) UCL	74.19

Gamma Distribution Test

k star (bias corrected)	0.839	Data Distribution	
Theta Star	28.64	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	24.04		
MLE of Standard Deviation	26.24		
nu star	18.47		
Approximate Chi Square Value (.05)	9.73	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	43.19
Adjusted Chi Square Value	8.714	95% Jackknife UCL	45.15
		95% Standard Bootstrap UCL	42.1
Anderson-Darling Test Statistic	2.044	95% Bootstrap-t UCL	304.6
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	270.7
Kolmogorov-Smirnov Test Statistic	0.431	95% Percentile Bootstrap UCL	45.26
Kolmogorov-Smirnov 5% Critical Value	0.262	95% BCA Bootstrap UCL	59.23
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.8
		97.5% Chebyshev(Mean, Sd) UCL	96.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	139.9
95% Approximate Gamma UCL	45.63		
95% Adjusted Gamma UCL	50.95		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 74.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	37.68	Minimum of Log Data	3.629
Maximum		85 Maximum of Log Data	4.443
Mean	63.86	Mean of log Data	4.106
Median	55.44	SD of log Data	0.34
SD	20.82		
Coefficient of Variation	0.326		
Skewness	0.028		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.78	Shapiro Wilk Test Statistic	0.811
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	75.24	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	79.58
95% Adjusted-CLT UCL (Chen-1995)	74.24	95% Chebyshev (MVUE) UCL	92.76
95% Modified-t UCL (Johnson-1978)	75.25	97.5% Chebyshev (MVUE) UCL	105.2
		99% Chebyshev (MVUE) UCL	129.7

Gamma Distribution Test

k star (bias corrected)	7.287	Data Distribution	
Theta Star	8.763	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.86		
MLE of Standard Deviation	23.66		
nu star	160.3		
Approximate Chi Square Value (.05)	132	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	74.19
Adjusted Chi Square Value	127.9	95% Jackknife UCL	75.24
		95% Standard Bootstrap UCL	73.68
Anderson-Darling Test Statistic	1.043	95% Bootstrap-t UCL	75.89
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	72.66
Kolmogorov-Smirnov Test Statistic	0.308	95% Percentile Bootstrap UCL	73.77
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	74.56
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	91.23
		97.5% Chebyshev(Mean, Sd) UCL	103.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	126.3
95% Approximate Gamma UCL	77.53		
95% Adjusted Gamma UCL	80.07		

Potential UCL to Use

Use 95% Student's-t UCL 75.24
or 95% Modified-t UCL 75.25

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	9.51	Minimum of Log Data	2.252
Maximum	1992	Maximum of Log Data	7.597
Mean	303.9	Mean of log Data	4.271
Median	43.19	SD of log Data	1.695
SD	602.7		
Coefficient of Variation	1.984		
Skewness	2.651		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.563	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	633.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3300
95% Adjusted-CLT UCL (Chen-1995)	758	95% Chebyshev (MVUE) UCL	799.3
95% Modified-t UCL (Johnson-1978)	657.5	97.5% Chebyshev (MVUE) UCL	1043
		99% Chebyshev (MVUE) UCL	1522

Gamma Distribution Test

k star (bias corrected)	0.386	Data Distribution	
Theta Star	787.6	Data appear Lognormal at 5% Significance Level	
MLE of Mean	303.9		
MLE of Standard Deviation	489.2		
nu star	8.488		
Approximate Chi Square Value (.05)	3.021	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	602.8
Adjusted Chi Square Value	2.514	95% Jackknife UCL	633.3
		95% Standard Bootstrap UCL	586.2
Anderson-Darling Test Statistic	1.004	95% Bootstrap-t UCL	2077
Anderson-Darling 5% Critical Value	0.791	95% Hall's Bootstrap UCL	2222
Kolmogorov-Smirnov Test Statistic	0.314	95% Percentile Bootstrap UCL	635.6
Kolmogorov-Smirnov 5% Critical Value	0.271	95% BCA Bootstrap UCL	836.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1096
		97.5% Chebyshev(Mean, Sd) UCL	1439
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2112
95% Approximate Gamma UCL	853.8		
95% Adjusted Gamma UCL	1026		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 2112

Recommended UCL exceeds the maximum observation
 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.029	Minimum of Log Data	-3.547
Maximum		10 Maximum of Log Data	2.303
Mean	8.937	Mean of log Data	1.754
Median		10 SD of log Data	1.759
SD	2.999		
Coefficient of Variation	0.336		
Skewness	-3.16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.421	Shapiro Wilk Test Statistic	0.36
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.58	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	352
95% Adjusted-CLT UCL (Chen-1995)	9.505	95% Chebyshev (MVUE) UCL	71.83
95% Modified-t UCL (Johnson-1978)	10.43	97.5% Chebyshev (MVUE) UCL	93.96
		99% Chebyshev (MVUE) UCL	137.4

Gamma Distribution Test

k star (bias corrected)	0.996	Data Distribution	
Theta Star	8.972	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.937		
MLE of Standard Deviation	8.955		
nu star	21.91		
Approximate Chi Square Value (.05)	12.27	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	10.42
Adjusted Chi Square Value	11.11	95% Jackknife UCL	10.58
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.709	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.261	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.88
		97.5% Chebyshev(Mean, Sd) UCL	14.58
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.94
95% Approximate Gamma UCL	15.96		
95% Adjusted Gamma UCL	17.62		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.94

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
Nickel

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	4
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Raw Statistics

		Log-transformed Statistics	
Minimum	13.4	Minimum of Log Data	2.595
Maximum	90.33	Maximum of Log Data	4.503
Mean	63.51	Mean of log Data	4.074
Median	65	SD of log Data	0.501
SD	18.38		
Coefficient of Variation	0.289		
Skewness	-2.07		

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.637	Shapiro Wilk Test Statistic	0.496
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.56	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	94.08
95% Adjusted-CLT UCL (Chen-1995)	68.94	95% Chebyshev (MVUE) UCL	110.1
95% Modified-t UCL (Johnson-1978)	72.98	97.5% Chebyshev (MVUE) UCL	129.2
		99% Chebyshev (MVUE) UCL	166.8

Gamma Distribution Test

k star (bias corrected)	4.865	Data Distribution	
Theta Star	13.06	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.51		
MLE of Standard Deviation	28.8		
nu star	107		

Approximate Chi Square Value (.05)	84.15	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	72.63
Adjusted Chi Square Value	80.85	95% Jackknife UCL	73.56
		95% Standard Bootstrap UCL	72.1

Anderson-Darling Test Statistic	2.497	95% Bootstrap-t UCL	70.46
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	70.34
Kolmogorov-Smirnov Test Statistic	0.484	95% Percentile Bootstrap UCL	71.41
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	70.01
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.67
		97.5% Chebyshev(Mean, Sd) UCL	98.12
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	118.7
95% Approximate Gamma UCL	80.78		
95% Adjusted Gamma UCL	84.08		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	87.67
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 180-02.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Antimony

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.25	Minimum of Log Data	-1.386
Maximum	0.59	Maximum of Log Data	-0.528
Mean	0.42	Mean of log Data	-0.882
Median	0.42	SD of log Data	0.186
SD	0.073		
Coefficient of Variation	0.173		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.579
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.458	95% H-UCL	0.467
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.519
95% Adjusted-CLT UCL (Chen-1995)	0.454	97.5% Chebyshev (MVUE) UCL	0.562
95% Modified-t UCL (Johnson-1978)	0.458	99% Chebyshev (MVUE) UCL	0.646

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	25.33	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.017		
MLE of Mean	0.42		
MLE of Standard Deviation	0.084		
nu star	607.9		
Approximate Chi Square Value (.05)	551.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.454
Adjusted Chi Square Value	543.5	95% Jackknife UCL	0.458
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.741	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.44	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.511
		97.5% Chebyshev(Mean, Sd) UCL	0.551
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.628
95% Approximate Gamma UCL	0.463		
95% Adjusted Gamma UCL	0.47		

Potential UCL to Use

Use 95% Student's-t UCL 0.458
 or 95% Modified-t UCL 0.458

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	8.09	Minimum of Log Data	2.091
Maximum	18.65	Maximum of Log Data	2.926
Mean	11.27	Mean of log Data	2.401
Median	11	SD of log Data	0.209
SD	2.666		
Coefficient of Variation	0.237		
Skewness	2.038		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.739	Shapiro Wilk Test Statistic	0.82
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	12.65	95% H-UCL	12.67
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.23
95% Adjusted-CLT UCL (Chen-1995)	13.02	97.5% Chebyshev (MVUE) UCL	15.51
95% Modified-t UCL (Johnson-1978)	12.73	99% Chebyshev (MVUE) UCL	18.04

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	17.56	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.642		
MLE of Mean	11.27		
MLE of Standard Deviation	2.69		
nu star	421.4		
Approximate Chi Square Value (.05)	374.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12.54
Adjusted Chi Square Value	368.1	95% Jackknife UCL	12.65
		95% Standard Bootstrap UCL	12.53
Anderson-Darling Test Statistic	1.192	95% Bootstrap-t UCL	13.61
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	19.85
Kolmogorov-Smirnov Test Statistic	0.352	95% Percentile Bootstrap UCL	12.55
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	13
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.63
		97.5% Chebyshev(Mean, Sd) UCL	16.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.93
95% Approximate Gamma UCL	12.67		
95% Adjusted Gamma UCL	12.9		

Potential UCL to Use

Use 95% Student's-t UCL 12.65
or 95% Modified-t UCL 12.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	14.5	Minimum of Log Data	2.674
Maximum	85	Maximum of Log Data	4.443
Mean	59.98	Mean of log Data	3.97
Median	64.82	SD of log Data	0.566
SD	27.08		
Coefficient of Variation	0.451		
Skewness	-0.27		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.776	Shapiro Wilk Test Statistic	0.79
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	74.02	95% H-UCL	90.95
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	106.2
95% Adjusted-CLT UCL (Chen-1995)	72.19	97.5% Chebyshev (MVUE) UCL	125.7
95% Modified-t UCL (Johnson-1978)	73.92	99% Chebyshev (MVUE) UCL	163.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.195	Data do not follow a Discernable Distribution (0.05)	
Theta Star	18.78		
MLE of Mean	59.98		
MLE of Standard Deviation	33.56		
nu star	76.67		

Approximate Chi Square Value (.05)

		Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	72.84
Adjusted Chi Square Value	54.97	95% Jackknife UCL	74.02

Anderson-Darling Test Statistic

		95% Standard Bootstrap UCL	72.03
Anderson-Darling Test Statistic	1.171	95% Bootstrap-t UCL	72.93
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	71.04
Kolmogorov-Smirnov Test Statistic	0.32	95% Percentile Bootstrap UCL	73.2
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	71.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.06
		97.5% Chebyshev(Mean, Sd) UCL	108.8
		99% Chebyshev(Mean, Sd) UCL	137.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	79.98
95% Adjusted Gamma UCL	83.66

Potential UCL to Use

		Use 95% Chebyshev (Mean, Sd) UCL	94.06
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	10.7	Minimum of Log Data	2.37
Maximum	84.16	Maximum of Log Data	4.433
Mean	59.09	Mean of log Data	3.921
Median	65	SD of log Data	0.716
SD	23.53		
Coefficient of Variation	0.398		
Skewness	-1.6		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.672	Shapiro Wilk Test Statistic	0.567
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	71.29	95% H-UCL	110.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	123.3
95% Adjusted-CLT UCL (Chen-1995)	66.91	97.5% Chebyshev (MVUE) UCL	149.1
95% Modified-t UCL (Johnson-1978)	70.77	99% Chebyshev (MVUE) UCL	199.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.541	Data do not follow a Discernable Distribution (0.05)	
Theta Star	23.25		
MLE of Mean	59.09		
MLE of Standard Deviation	37.07		
nu star	60.99		
Approximate Chi Square Value (.05)	44.03	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	70.27
Adjusted Chi Square Value	41.84	95% Jackknife UCL	71.29
		95% Standard Bootstrap UCL	69.81
Anderson-Darling Test Statistic	2.548	95% Bootstrap-t UCL	68
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	66.97
Kolmogorov-Smirnov Test Statistic	0.474	95% Percentile Bootstrap UCL	69.47
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	68.09
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	88.7
		97.5% Chebyshev(Mean, Sd) UCL	101.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	126.7
95% Approximate Gamma UCL	81.86		
95% Adjusted Gamma UCL	86.15		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 88.7

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options			
From File	180-03.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	17	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	4.4	Minimum of Log Data	1.482
Maximum	30.3	Maximum of Log Data	3.411
Mean	11.07	Mean of log Data	2.329
Median	11	SD of log Data	0.378
SD	5.374		
Coefficient of Variation	0.485		
Skewness	3.049		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.613	Shapiro Wilk Test Statistic	0.812
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	13.35	95% H-UCL	13.23
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	15.46
95% Adjusted-CLT UCL (Chen-1995)	14.25	97.5% Chebyshev (MVUE) UCL	17.39
95% Modified-t UCL (Johnson-1978)	13.51	99% Chebyshev (MVUE) UCL	21.2
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.614	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.972		
MLE of Mean	11.07		
MLE of Standard Deviation	4.673		
nu star	190.9		
Approximate Chi Square Value (.05)	159.9	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	13.22
Adjusted Chi Square Value	157	95% Jackknife UCL	13.35
		95% Standard Bootstrap UCL	13.19
Anderson-Darling Test Statistic	1.625	95% Bootstrap-t UCL	15.31
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	23
Kolmogorov-Smirnov Test Statistic	0.279	95% Percentile Bootstrap UCL	13.39
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	14.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.75
		97.5% Chebyshev(Mean, Sd) UCL	19.21
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	24.04
95% Approximate Gamma UCL	13.22		
95% Adjusted Gamma UCL	13.47		
Potential UCL to Use		Use 95% Student's-t UCL	13.35
		or 95% Modified-t UCL	13.51

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

Minimum	13.2	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.58
Mean	73.7	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.22
SD	22.11	SD of log Data	0.491
Coefficient of Variation	0.3		
Skewness	-1.81		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Test Statistic	0.531
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	83.06	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	98.47
95% Adjusted-CLT UCL (Chen-1995)	80.01	95% Chebyshev (MVUE) UCL	117
95% Modified-t UCL (Johnson-1978)	82.67	97.5% Chebyshev (MVUE) UCL	134.7
		99% Chebyshev (MVUE) UCL	169.4

Gamma Distribution Test

k star (bias corrected)	5.336	Data Distribution	
Theta Star	13.81	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	73.7		
MLE of Standard Deviation	31.9		
nu star	181.4		
Approximate Chi Square Value (.05)	151.3	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	82.52
Adjusted Chi Square Value	148.4	95% Jackknife UCL	83.06
		95% Standard Bootstrap UCL	82.33
Anderson-Darling Test Statistic	3.527	95% Bootstrap-t UCL	81.13
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	80.37
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	80.78
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	80.24
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	97.07
		97.5% Chebyshev(Mean, Sd) UCL	107.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	127.1
95% Approximate Gamma UCL	88.39		
95% Adjusted Gamma UCL	90.11		

Potential UCL to Use

Use 95% Student's-t UCL 83.06
or 95% Modified-t UCL 82.67

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	12.9	Minimum of Log Data	2.557
Maximum	68.91	Maximum of Log Data	4.233
Mean	62.29	Mean of log Data	4.085
Median	65	SD of log Data	0.394
SD	12.78		
Coefficient of Variation	0.205		
Skewness	-4.06		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.322	Shapiro Wilk Test Statistic	0.291
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.71	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	77.71
95% Adjusted-CLT UCL (Chen-1995)	64.13	95% Chebyshev (MVUE) UCL	91.08
95% Modified-t UCL (Johnson-1978)	67.2	97.5% Chebyshev (MVUE) UCL	102.8
		99% Chebyshev (MVUE) UCL	125.9

Gamma Distribution Test

k star (bias corrected)	8.889	Data Distribution	
Theta Star	7.008	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	62.29		
MLE of Standard Deviation	20.89		
nu star	302.2		
Approximate Chi Square Value (.05)	263	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	67.39
Adjusted Chi Square Value	259.1	95% Jackknife UCL	67.71
		95% Standard Bootstrap UCL	67.2
Anderson-Darling Test Statistic	5.606	95% Bootstrap-t UCL	66
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	65.48
Kolmogorov-Smirnov Test Statistic	0.522	95% Percentile Bootstrap UCL	65.7
Kolmogorov-Smirnov 5% Critical Value	0.209	95% BCA Bootstrap UCL	65.52
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	75.81
		97.5% Chebyshev(Mean, Sd) UCL	81.65
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	93.14
95% Approximate Gamma UCL	71.6		
95% Adjusted Gamma UCL	72.66		

Potential UCL to Use

Use 95% Student's-t UCL 67.71
or 95% Modified-t UCL 67.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 17 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.043	Minimum of Log Data	-3.147
Maximum	11.4	Maximum of Log Data	2.434
Mean	9.521	Mean of log Data	1.992
Median	10	SD of log Data	1.325
SD	2.467		
Coefficient of Variation	0.259		
Skewness	-3.98		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.343	Shapiro Wilk Test Statistic	0.276
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.57	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	50.61
95% Adjusted-CLT UCL (Chen-1995)	9.889	95% Chebyshev (MVUE) UCL	42.18
95% Modified-t UCL (Johnson-1978)	10.47	97.5% Chebyshev (MVUE) UCL	53.43
		99% Chebyshev (MVUE) UCL	75.53

Gamma Distribution Test

k star (bias corrected)	1.739	Data Distribution	
Theta Star	5.474	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.521		
MLE of Standard Deviation	7.219		
nu star	59.13		
Approximate Chi Square Value (.05)	42.45	Nonparametric Statistics	
Adjusted Level of Significance	0.035	95% CLT UCL	10.5
Adjusted Chi Square Value	40.97	95% Jackknife UCL	10.57
		95% Standard Bootstrap UCL	10.47
Anderson-Darling Test Statistic	6.024	95% Bootstrap-t UCL	10.25
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	10.13
Kolmogorov-Smirnov Test Statistic	0.561	95% Percentile Bootstrap UCL	10.19
Kolmogorov-Smirnov 5% Critical Value	0.212	95% BCA Bootstrap UCL	10.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.13
		97.5% Chebyshev(Mean, Sd) UCL	13.26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.47
95% Approximate Gamma UCL	13.26		
95% Adjusted Gamma UCL	13.74		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.13

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	180-04.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	15	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	5.78	Minimum of Log Data	1.754
Maximum	19.2	Maximum of Log Data	2.955
Mean	9.981	Mean of log Data	2.249
Median	11	SD of log Data	0.333
SD	3.408		
Coefficient of Variation	0.341		
Skewness	1.119		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.759	Shapiro Wilk Test Statistic	0.8
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	11.53	95% H-UCL	11.87
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.77
95% Adjusted-CLT UCL (Chen-1995)	11.7	97.5% Chebyshev (MVUE) UCL	15.41
95% Modified-t UCL (Johnson-1978)	11.57	99% Chebyshev (MVUE) UCL	18.63
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	7.898	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.264		
MLE of Mean	9.981		
MLE of Standard Deviation	3.552		
nu star	236.9		
Approximate Chi Square Value (.05)	202.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	11.43
Adjusted Chi Square Value	198.4	95% Jackknife UCL	11.53
		95% Standard Bootstrap UCL	11.33
Anderson-Darling Test Statistic	1.626	95% Bootstrap-t UCL	11.7
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	12.29
Kolmogorov-Smirnov Test Statistic	0.328	95% Percentile Bootstrap UCL	11.43
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	11.73
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.82
		97.5% Chebyshev(Mean, Sd) UCL	15.48
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.74
95% Approximate Gamma UCL	11.69		
95% Adjusted Gamma UCL	11.92		
Potential UCL to Use		Use 95% Student's-t UCL	11.53
		or 95% Modified-t UCL	11.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Barium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Beryllium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	24.8	Minimum of Log Data	3.211
Maximum	85	Maximum of Log Data	4.443
Mean	64.8	Mean of log Data	4.093
Median	85	SD of log Data	0.434
SD	23.74		
Coefficient of Variation	0.366		
Skewness	-0.492		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.774	Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	75.6	95% H-UCL	83.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	98.12
95% Adjusted-CLT UCL (Chen-1995)	74.05	97.5% Chebyshev (MVUE) UCL	112.3
95% Modified-t UCL (Johnson-1978)	75.47	99% Chebyshev (MVUE) UCL	140.1

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.268	Data do not follow a Discernable Distribution (0.05)	
Theta Star	12.3		
MLE of Mean	64.8		
MLE of Standard Deviation	28.24		
nu star	158		
Approximate Chi Square Value (.05)	130	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	74.88
Adjusted Chi Square Value	126.8	95% Jackknife UCL	75.6
		95% Standard Bootstrap UCL	74.48
Anderson-Darling Test Statistic	1.485	95% Bootstrap-t UCL	74.52
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	73.29
Kolmogorov-Smirnov Test Statistic	0.337	95% Percentile Bootstrap UCL	74.29
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	74.24
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	91.52
		97.5% Chebyshev(Mean, Sd) UCL	103.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	125.8
95% Approximate Gamma UCL	78.8		
95% Adjusted Gamma UCL	80.74		

Potential UCL to Use

Use 95% Student's-t UCL 75.6
or 95% Modified-t UCL 75.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	6869	Minimum of Log Data	8.835
Maximum	35300	Maximum of Log Data	10.47
Mean	12227	Mean of log Data	9.304
Median	10245	SD of log Data	0.442
SD	7127		
Coefficient of Variation	0.583		
Skewness	2.65		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.867
Shapiro Wilk Test Statistic	0.684	Shapiro Wilk Critical Value	0.881
Shapiro Wilk Critical Value	0.881	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	15468	95% H-UCL	15362
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18162
95% Adjusted-CLT UCL (Chen-1995)	#####	97.5% Chebyshev (MVUE) UCL	20815
95% Modified-t UCL (Johnson-1978)	15677	99% Chebyshev (MVUE) UCL	26026

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.915	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	3123		
MLE of Mean	12227		
MLE of Standard Deviation	6179		
nu star	117.5		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0324	Nonparametric Statistics	
Adjusted Chi Square Value	90.8	95% CLT UCL	15253
		95% Jackknife UCL	15468
		95% Standard Bootstrap UCL	15196
Anderson-Darling Test Statistic	0.828	95% Bootstrap-t UCL	18232
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	27813
Kolmogorov-Smirnov Test Statistic	0.169	95% Percentile Bootstrap UCL	15464
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	16803
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20247
		97.5% Chebyshev(Mean, Sd) UCL	23718
		99% Chebyshev(Mean, Sd) UCL	30535

Assuming Gamma Distribution

95% Approximate Gamma UCL	15370
95% Adjusted Gamma UCL	15816

Potential UCL to Use

Use 95% Approximate Gamma UCL 15370

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	157.2	Minimum of Log Data	5.058
Maximum	1990	Maximum of Log Data	7.596
Mean	495.4	Mean of log Data	5.97
Median	415.7	SD of log Data	0.645
SD	455.7		
Coefficient of Variation	0.92		
Skewness	2.859		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.638	Shapiro Wilk Test Statistic	0.912
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	702.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	708.9
95% Adjusted-CLT UCL (Chen-1995)	781.8	95% Chebyshev (MVUE) UCL	835
95% Modified-t UCL (Johnson-1978)	717.1	97.5% Chebyshev (MVUE) UCL	991
		99% Chebyshev (MVUE) UCL	1298

Gamma Distribution Test

k star (bias corrected)	1.863	Data Distribution	
Theta Star	265.9	Data appear Lognormal at 5% Significance Level	
MLE of Mean	495.4		
MLE of Standard Deviation	362.9		
nu star	55.9		
Approximate Chi Square Value (.05)	39.72	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	689
Adjusted Chi Square Value	38.04	95% Jackknife UCL	702.7
		95% Standard Bootstrap UCL	680.1
Anderson-Darling Test Statistic	0.892	95% Bootstrap-t UCL	1044
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	1582
Kolmogorov-Smirnov Test Statistic	0.23	95% Percentile Bootstrap UCL	696
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	793.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1008
		97.5% Chebyshev(Mean, Sd) UCL	1230
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1666
95% Approximate Gamma UCL	697.3		
95% Adjusted Gamma UCL	728		

Potential UCL to Use

Use 95% H-UCL 708.9

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	10.2	Minimum of Log Data	2.322
Maximum	65	Maximum of Log Data	4.174
Mean	60.41	Mean of log Data	4.035
Median	65	SD of log Data	0.476
SD	14.14		
Coefficient of Variation	0.234		
Skewness	-3.659		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.378	Shapiro Wilk Test Statistic	0.331
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	66.84	95% H-UCL	82.16
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	97.42
95% Adjusted-CLT UCL (Chen-1995)	62.73	97.5% Chebyshev (MVUE) UCL	112.4
95% Modified-t UCL (Johnson-1978)	66.26	99% Chebyshev (MVUE) UCL	141.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	6.269	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.635		
MLE of Mean	60.41		
MLE of Standard Deviation	24.13		
nu star	188.1		
Approximate Chi Square Value (.05)	157.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	66.41
Adjusted Chi Square Value	153.9	95% Jackknife UCL	66.84
		95% Standard Bootstrap UCL	66.17
Anderson-Darling Test Statistic	4.579	95% Bootstrap-t UCL	64.87
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	64.12
Kolmogorov-Smirnov Test Statistic	0.43	95% Percentile Bootstrap UCL	64.73
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	64.06
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	76.32
		97.5% Chebyshev(Mean, Sd) UCL	83.21
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	96.74
95% Approximate Gamma UCL	72.2		
95% Adjusted Gamma UCL	73.83		

Potential UCL to Use

Use 95% Student's-t UCL 66.84
or 95% Modified-t UCL 66.26

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	10	Maximum of Log Data	2.303
Mean	9.314	Mean of log Data	1.913
Median	10	SD of log Data	1.499
SD	2.57		
Coefficient of Variation	0.276		
Skewness	-3.866		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.297	Shapiro Wilk Test Statistic	0.286
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.48	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	88.59
95% Adjusted-CLT UCL (Chen-1995)	9.698	95% Chebyshev (MVUE) UCL	53.29
95% Modified-t UCL (Johnson-1978)	10.37	97.5% Chebyshev (MVUE) UCL	68.47
		99% Chebyshev (MVUE) UCL	98.28

Gamma Distribution Test

k star (bias corrected)	1.419	Data Distribution	
Theta Star	6.564	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.314		
MLE of Standard Deviation	7.819		
nu star	42.57		
Approximate Chi Square Value (.05)	28.61	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.41
Adjusted Chi Square Value	27.21	95% Jackknife UCL	10.48
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	5.525	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.554	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.21
		97.5% Chebyshev(Mean, Sd) UCL	13.46
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.92
95% Approximate Gamma UCL	13.86		
95% Adjusted Gamma UCL	14.57		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.21

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
------------------------------	----	---------------------------------	---

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	181-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	20.4	Minimum of Log Data	3.016
Maximum	47.9	Maximum of Log Data	3.869
Mean	33.17	Mean of log Data	3.495
Median	33.17	SD of log Data	0.118
SD	3.771		
Coefficient of Variation	0.114		
Skewness	0.826		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.406	Shapiro Wilk Test Statistic	0.402
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	34.38	95% H-UCL	34.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	36.4
95% Adjusted-CLT UCL (Chen-1995)	34.46	97.5% Chebyshev (MVUE) UCL	37.79
95% Modified-t UCL (Johnson-1978)	34.4	99% Chebyshev (MVUE) UCL	40.53

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	69.78	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.475		
MLE of Mean	33.17		
MLE of Standard Deviation	3.97		
nu star	3908		
Approximate Chi Square Value (.05)	3764	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	34.34
Adjusted Chi Square Value	3755	95% Jackknife UCL	34.38
		95% Standard Bootstrap UCL	34.3
Anderson-Darling Test Statistic	8.112	95% Bootstrap-t UCL	34.35
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	35.26
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	34.29
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	34.68
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	36.27
		97.5% Chebyshev(Mean, Sd) UCL	37.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	40.26
95% Approximate Gamma UCL	34.44		
95% Adjusted Gamma UCL	34.52		

Potential UCL to Use

Use 95% Student's-t UCL	34.38
or 95% Modified-t UCL	34.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.02	Minimum of Log Data	-3.912
Maximum	0.17	Maximum of Log Data	-1.772
Mean	0.0967	Mean of log Data	-2.371
Median	0.0967	SD of log Data	0.32
SD	0.0204		
Coefficient of Variation	0.211		
Skewness	-0.263		

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.386	Shapiro Wilk Test Statistic	0.317
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.103	95% H-UCL	0.11
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.124
95% Adjusted-CLT UCL (Chen-1995)	0.103	97.5% Chebyshev (MVUE) UCL	0.136
95% Modified-t UCL (Johnson-1978)	0.103	99% Chebyshev (MVUE) UCL	0.158

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	12.96	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00746		
MLE of Mean	0.0967		
MLE of Standard Deviation	0.0268		
nu star	726		
Approximate Chi Square Value (.05)	664.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	0.103
Adjusted Chi Square Value	660.8	95% Jackknife UCL	0.103
		95% Standard Bootstrap UCL	0.103
Anderson-Darling Test Statistic	8.68	95% Bootstrap-t UCL	0.102
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.104
Kolmogorov-Smirnov Test Statistic	0.499	95% Percentile Bootstrap UCL	0.102
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	0.102
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.113
		97.5% Chebyshev(Mean, Sd) UCL	0.121
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.135
95% Approximate Gamma UCL	0.106		
95% Adjusted Gamma UCL	0.106		

Potential UCL to Use	Use 95% Student's-t UCL	0.103
	or 95% Modified-t UCL	0.103

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	1.86	Minimum of Log Data	0.621
Maximum	9.12	Maximum of Log Data	2.21
Mean	4.827	Mean of log Data	1.551
Median	4.827	SD of log Data	0.228
SD	1.036		
Coefficient of Variation	0.215		
Skewness	#####		

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.432	Shapiro Wilk Test Statistic	0.438
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	5.16	95% H-UCL	5.231
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.754
95% Adjusted-CLT UCL (Chen-1995)	5.221	97.5% Chebyshev (MVUE) UCL	6.151
95% Modified-t UCL (Johnson-1978)	5.171	99% Chebyshev (MVUE) UCL	6.93

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	19.74	Data do not follow a Discernable Distribution (0.05)	
Theta Star	#####		
MLE of Mean	4.827		
MLE of Standard Deviation	1.086		
nu star	1106		
Approximate Chi Square Value (.05)	1029	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	5.149
Adjusted Chi Square Value	1025	95% Jackknife UCL	5.16
		95% Standard Bootstrap UCL	5.142
Anderson-Darling Test Statistic	7.698	95% Bootstrap-t UCL	5.211
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	6.054
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	5.133
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	5.181
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.68
		97.5% Chebyshev(Mean, Sd) UCL	6.05
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.775
95% Approximate Gamma UCL	5.184		
95% Adjusted Gamma UCL	5.207		

Potential UCL to Use

Use 95% Student's-t UCL	5.16
or 95% Modified-t UCL	5.171

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0285	Minimum of Log Data	-3.557
Maximum	0.0391	Maximum of Log Data	-3.241
Mean	0.0338	Mean of log Data	-3.387
Median	0.0338	SD of log Data	0.0431
SD	0.00144		
Coefficient of Variation	0.0427		
Skewness	#####		

Warning: There are only 3 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.375	Shapiro Wilk Test Statistic	0.372
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0343	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.0343	95% Chebyshev (MVUE) UCL	0.035
95% Modified-t UCL (Johnson-1978)	0.0343	97.5% Chebyshev (MVUE) UCL	0.0356
		99% Chebyshev (MVUE) UCL	0.0366

Gamma Distribution Test

k star (bias corrected)	502.7	Data Distribution	
Theta Star	#####	502.7 Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0338		
MLE of Standard Deviation	0.00151		
nu star	28152		
Approximate Chi Square Value (.05)	27763	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	0.0343
Adjusted Chi Square Value	27739	95% Jackknife UCL	0.0343
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	8.711	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.47	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.035
		97.5% Chebyshev(Mean, Sd) UCL	0.0355
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0366
95% Approximate Gamma UCL	0.0343		
95% Adjusted Gamma UCL	0.0343		

Potential UCL to Use	Use 95% Student's-t UCL	0.0343
	or 95% Modified-t UCL	0.0343

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 181-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Chromium

General Statistics

Number of Valid Observations 28 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	17.5 Minimum of Log Data	2.862
Maximum	31.2 Maximum of Log Data	3.44
Mean	22.17 Mean of log Data	3.095
Median	22.17 SD of log Data	0.0903
SD	2.13	
Coefficient of Variation	0.0961	
Skewness	2.281	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.428 Shapiro Wilk Test Statistic	0.453
Shapiro Wilk Critical Value	0.924 Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	22.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	23.01	95% Chebyshev (MVUE) UCL	23.82
95% Modified-t UCL (Johnson-1978)	22.88	97.5% Chebyshev (MVUE) UCL	24.53
		99% Chebyshev (MVUE) UCL	25.93

Gamma Distribution Test

k star (bias corrected)	109.9	Data Distribution	
Theta Star	0.202	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	22.17		
MLE of Standard Deviation	2.115		
nu star	6153		
Approximate Chi Square Value (.05)	5971	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	22.83
Adjusted Chi Square Value	5960	95% Jackknife UCL	22.85
		95% Standard Bootstrap UCL	22.83
Anderson-Darling Test Statistic	7.71	95% Bootstrap-t UCL	23.02
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	26.76
Kolmogorov-Smirnov Test Statistic	0.452	95% Percentile Bootstrap UCL	22.81
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	23.13
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23.92
		97.5% Chebyshev(Mean, Sd) UCL	24.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26.17
95% Approximate Gamma UCL	22.84		
95% Adjusted Gamma UCL	22.88		

Potential UCL to Use Use 95% Student's-t UCL 22.85
 or 95% Modified-t UCL 22.88

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	1.86	Minimum of Log Data	0.621
Maximum	9.36	Maximum of Log Data	2.236
Mean	4.907	Mean of log Data	1.567
Median	4.907	SD of log Data	0.232
SD	1.073		
Coefficient of Variation	0.219		
Skewness	1.848		

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However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.432	Shapiro Wilk Test Statistic	0.44
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	5.252	95% H-UCL	5.327
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.868
95% Adjusted-CLT UCL (Chen-1995)	5.316	97.5% Chebyshev (MVUE) UCL	6.279
95% Modified-t UCL (Johnson-1978)	5.264	99% Chebyshev (MVUE) UCL	7.087

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	19.05	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.258		
MLE of Mean	4.907		
MLE of Standard Deviation	1.124		
nu star	1067		
Approximate Chi Square Value (.05)	992.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	5.24
Adjusted Chi Square Value	987.7	95% Jackknife UCL	5.252
		95% Standard Bootstrap UCL	5.25
Anderson-Darling Test Statistic	7.691	95% Bootstrap-t UCL	5.272
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	6.4
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	5.225
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	5.275
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.791
		97.5% Chebyshev(Mean, Sd) UCL	6.173
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.925
95% Approximate Gamma UCL	5.277		
95% Adjusted Gamma UCL	5.3		

Potential UCL to Use

Use 95% Student's-t UCL	5.252
or 95% Modified-t UCL	5.264

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	28	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0285	Minimum of Log Data	-3.557
Maximum	0.0391	Maximum of Log Data	-3.241
Mean	0.0338	Mean of log Data	-3.387
Median	0.0338	SD of log Data	0.0431
SD	0.00144		
Coefficient of Variation	0.0427		
Skewness	2.35E-14		

Warning: There are only 3 Distinct Values in this data
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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.375	Shapiro Wilk Test Statistic	0.372
Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0343	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.0343	95% Chebyshev (MVUE) UCL	0.035
95% Modified-t UCL (Johnson-1978)	0.0343	97.5% Chebyshev (MVUE) UCL	0.0356
		99% Chebyshev (MVUE) UCL	0.0366

Gamma Distribution Test

k star (bias corrected)	502.7	Data Distribution	
Theta Star	6.73E-05	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0338		
MLE of Standard Deviation	0.00151		
nu star	28152		
Approximate Chi Square Value (.05)	27763	Nonparametric Statistics	
Adjusted Level of Significance	0.0404	95% CLT UCL	0.0343
Adjusted Chi Square Value	27739	95% Jackknife UCL	0.0343
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	8.711	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.47	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.035
		97.5% Chebyshev(Mean, Sd) UCL	0.0355
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0366
95% Approximate Gamma UCL	0.0343		
95% Adjusted Gamma UCL	0.0343		

Potential UCL to Use		Use 95% Student's-t UCL	0.0343
		or 95% Modified-t UCL	0.0343

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	6
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Raw Statistics

Minimum	4.6	Log-transformed Statistics	
Maximum	16.88	Minimum of Log Data	1.526
Mean	9.653	Maximum of Log Data	2.826
Median	11	Mean of log Data	2.201
SD	3.59	SD of log Data	0.392
Coefficient of Variation	0.372		
Skewness	0.48		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.885	Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.73	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.81
95% Adjusted-CLT UCL (Chen-1995)		95% Chebyshev (MVUE) UCL	14.98
95% Modified-t UCL (Johnson-1978)	11.76	97.5% Chebyshev (MVUE) UCL	17.27
		99% Chebyshev (MVUE) UCL	21.77

Gamma Distribution Test

k star (bias corrected)	5.478	Data Distribution	
Theta Star	1.762	Data appear Normal at 5% Significance Level	
MLE of Mean	9.653		
MLE of Standard Deviation	4.124		
nu star	109.6		
Approximate Chi Square Value (.05)	86.39	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	11.52
Adjusted Chi Square Value	82.82	95% Jackknife UCL	11.73
		95% Standard Bootstrap UCL	11.41
Anderson-Darling Test Statistic	0.655	95% Bootstrap-t UCL	11.79
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL	12.07
Kolmogorov-Smirnov Test Statistic	0.288	95% Percentile Bootstrap UCL	11.54
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	11.63
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.6
		97.5% Chebyshev(Mean, Sd) UCL	16.74
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.95
95% Approximate Gamma UCL	12.24		
95% Adjusted Gamma UCL	12.77		

Potential UCL to Use

Use 95% Student's-t UCL	11.73
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.039	Minimum of Log Data -3.244
Maximum	0.44	Maximum of Log Data -0.821
Mean	0.24	Mean of log Data -1.55
Median	0.24	SD of log Data 0.625
SD	0.0945	
Coefficient of Variation	0.395	
Skewness	5.71E-16	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.659	Shapiro Wilk Test Statistic 0.55
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value 0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.294	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.426
95% Adjusted-CLT UCL (Chen-1995)	0.289	95% Chebyshev (MVUE) UCL	0.476
95% Modified-t UCL (Johnson-1978)	0.294	97.5% Chebyshev (MVUE) UCL	0.572
		99% Chebyshev (MVUE) UCL	0.762

Gamma Distribution Test

k star (bias corrected)	3.079	Data Distribution	
Theta Star	0.0778	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.24		
MLE of Standard Deviation	0.136		
nu star	61.57		
Approximate Chi Square Value (.05)	44.53	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.289
Adjusted Chi Square Value	42.02	95% Jackknife UCL	0.294
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.202	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.464	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.37
		97.5% Chebyshev(Mean, Sd) UCL	0.426
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.537
95% Approximate Gamma UCL	0.331		
95% Adjusted Gamma UCL	0.351		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 10

Raw Statistics

Minimum	32.58	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.484
Mean	49.35	Maximum of Log Data	4.443
Median	47.17	Mean of log Data	3.858
SD	15.84	SD of log Data	0.295
Coefficient of Variation	0.321		
Skewness	1.319		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	58.53	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	60.06
95% Adjusted-CLT UCL (Chen-1995)	59.82	95% Chebyshev (MVUE) UCL	69.42
95% Modified-t UCL (Johnson-1978)	58.88	97.5% Chebyshev (MVUE) UCL	78.15
		99% Chebyshev (MVUE) UCL	95.3

Gamma Distribution Test

k star (bias corrected)	8.671	Data Distribution	
Theta Star	5.691	Data appear Normal at 5% Significance Level	
MLE of Mean	49.35		
MLE of Standard Deviation	16.76		
nu star	173.4		
Approximate Chi Square Value (.05)	144	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	57.58
Adjusted Chi Square Value	139.3	95% Jackknife UCL	58.53
		95% Standard Bootstrap UCL	57.18
Anderson-Darling Test Statistic	0.29	95% Bootstrap-t UCL	62.67
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	72.87
Kolmogorov-Smirnov Test Statistic	0.169	95% Percentile Bootstrap UCL	57.71
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	59.53
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	71.18
		97.5% Chebyshev(Mean, Sd) UCL	80.62
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	99.18
95% Approximate Gamma UCL	59.44		
95% Adjusted Gamma UCL	61.43		

Potential UCL to Use Use 95% Student's-t UCL 58.53

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	7.6 Minimum of Log Data	2.028
Maximum	99.99 Maximum of Log Data	4.605
Mean	65.81 Mean of log Data	4.04
Median	65 SD of log Data	0.73
SD	24.5	
Coefficient of Variation	0.372	
Skewness	-1.394	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.857 Shapiro Wilk Test Statistic	0.601
Shapiro Wilk Critical Value	0.842 Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	80.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	139.1
95% Adjusted-CLT UCL (Chen-1995)	74.9	95% Chebyshev (MVUE) UCL	146.5
95% Modified-t UCL (Johnson-1978)	79.44	97.5% Chebyshev (MVUE) UCL	178.9
		99% Chebyshev (MVUE) UCL	242.3

Gamma Distribution Test

k star (bias corrected)	2.567	Data Distribution	
Theta Star	25.63	Data appear Normal at 5% Significance Level	
MLE of Mean	65.81		
MLE of Standard Deviation	41.07		
nu star	51.34		
Approximate Chi Square Value (.05)	35.89	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	78.55
Adjusted Chi Square Value	33.65	95% Jackknife UCL	80.01
		95% Standard Bootstrap UCL	78.07
Anderson-Darling Test Statistic	1.411	95% Bootstrap-t UCL	76.45
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	76.74
Kolmogorov-Smirnov Test Statistic	0.361	95% Percentile Bootstrap UCL	76.88
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	75.32
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	99.58
		97.5% Chebyshev(Mean, Sd) UCL	114.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	142.9
95% Approximate Gamma UCL	94.15		
95% Adjusted Gamma UCL	100.4		

Potential UCL to Use Use 95% Student's-t UCL 80.01

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	10	Maximum of Log Data	2.303
Mean	6.948	Mean of log Data	0.606
Median	10	SD of log Data	2.718
SD	4.773		
Coefficient of Variation	0.687		
Skewness	-1.029		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.613	Shapiro Wilk Test Statistic	0.61
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.715	95% H-UCL	48422
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	123.2
95% Adjusted-CLT UCL (Chen-1995)	8.906	97.5% Chebyshev (MVUE) UCL	164.8
95% Modified-t UCL (Johnson-1978)	9.633	99% Chebyshev (MVUE) UCL	246.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.403	Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.26		
MLE of Mean	6.948		
MLE of Standard Deviation	10.95		
nu star	8.052		
Approximate Chi Square Value (.05)	2.765	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	9.431
Adjusted Chi Square Value	2.256	95% Jackknife UCL	9.715
		95% Standard Bootstrap UCL	9.25
Anderson-Darling Test Statistic	2.297	95% Bootstrap-t UCL	8.863
Anderson-Darling 5% Critical Value	0.781	95% Hall's Bootstrap UCL	8.581
Kolmogorov-Smirnov Test Statistic	0.456	95% Percentile Bootstrap UCL	9.003
Kolmogorov-Smirnov 5% Critical Value	0.282	95% BCA Bootstrap UCL	8.94
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.53
		97.5% Chebyshev(Mean, Sd) UCL	16.37
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.97
95% Approximate Gamma UCL	20.23		
95% Adjusted Gamma UCL	24.8		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 21.97
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	0.42	Maximum of Log Data	-0.868
Mean	0.257	Mean of log Data	-1.402
Median	0.257	SD of log Data	0.324
SD	0.0734		
Coefficient of Variation	0.286		
Skewness	0.421		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.694	Shapiro Wilk Test Statistic	0.661
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.299	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.322
95% Adjusted-CLT UCL (Chen-1995)	0.298	95% Chebyshev (MVUE) UCL	0.374
95% Modified-t UCL (Johnson-1978)	0.3	97.5% Chebyshev (MVUE) UCL	0.425
		99% Chebyshev (MVUE) UCL	0.523

Gamma Distribution Test

k star (bias corrected)	8.476	Data Distribution	
Theta Star	0.0303	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.257		
MLE of Standard Deviation	0.0882		
nu star	169.5		

Approximate Chi Square Value (.05)	140.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.295
Adjusted Chi Square Value	135.8	95% Jackknife UCL	0.299
		95% Standard Bootstrap UCL	0.293
Anderson-Darling Test Statistic	1.816	95% Bootstrap-t UCL	0.296
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	0.322
Kolmogorov-Smirnov Test Statistic	0.362	95% Percentile Bootstrap UCL	0.291
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	0.304
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.358
		97.5% Chebyshev(Mean, Sd) UCL	0.402
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.488
95% Approximate Gamma UCL	0.31		
95% Adjusted Gamma UCL	0.32		

Potential UCL to Use Use 95% Student's-t UCL 0.299
 or 95% Modified-t UCL 0.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 3

Raw Statistics		Log-transformed Statistics	
Minimum	0.0071	Minimum of Log Data	-4.948
Maximum	0.02	Maximum of Log Data	-3.912
Mean	0.0136	Mean of log Data	-4.327
Median	0.0136	SD of log Data	0.25
SD	0.00304		
Coefficient of Variation	0.224		
Skewness	-1.57E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.659	Shapiro Wilk Test Statistic	0.628
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0153	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.016
95% Adjusted-CLT UCL (Chen-1995)	0.0151	95% Chebyshev (MVUE) UCL	0.0183
95% Modified-t UCL (Johnson-1978)	0.0153	97.5% Chebyshev (MVUE) UCL	0.0203
		99% Chebyshev (MVUE) UCL	0.0243

Gamma Distribution Test

k star (bias corrected)	13.8	Data Distribution	
Theta Star	9.82E-04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0136		
MLE of Standard Deviation	0.00365		
nu star	276.1		
Approximate Chi Square Value (.05)	238.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.0151
Adjusted Chi Square Value	232.5	95% Jackknife UCL	0.0153
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.053	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.43	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0177
		97.5% Chebyshev(Mean, Sd) UCL	0.0196
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0231
95% Approximate Gamma UCL	0.0157		
95% Adjusted Gamma UCL	0.0161		

Potential UCL to Use Use 95% Student's-t UCL 0.0153
 or 95% Modified-t UCL 0.0153

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	11
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Raw Statistics

Minimum	34.78	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.549
Mean	48.63	Maximum of Log Data	4.443
Median	44.74	Mean of log Data	3.855
SD	13.77	SD of log Data	0.243
Coefficient of Variation	0.283		
Skewness	2.063		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.788	Shapiro Wilk Test Statistic	0.885
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	56.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	56.27
95% Adjusted-CLT UCL (Chen-1995)	58.22	95% Chebyshev (MVUE) UCL	64.09
95% Modified-t UCL (Johnson-1978)	56.58	97.5% Chebyshev (MVUE) UCL	70.84
		99% Chebyshev (MVUE) UCL	84.1

Gamma Distribution Test

k star (bias corrected)	12.45	Data Distribution	
Theta Star	3.905	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	48.63		
MLE of Standard Deviation	13.78		
nu star	274		
Approximate Chi Square Value (.05)	236.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	55.46
Adjusted Chi Square Value	231	95% Jackknife UCL	56.15
		95% Standard Bootstrap UCL	55.21
Anderson-Darling Test Statistic	0.628	95% Bootstrap-t UCL	63.3
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	86.71
Kolmogorov-Smirnov Test Statistic	0.222	95% Percentile Bootstrap UCL	56.06
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	58.42
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	66.73
		97.5% Chebyshev(Mean, Sd) UCL	74.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	89.95
95% Approximate Gamma UCL	56.3		
95% Adjusted Gamma UCL	57.68		

Potential UCL to Use

Use 95% Approximate Gamma UCL 56.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.032	Minimum of Log Data -3.442
Maximum	10	Maximum of Log Data 2.303
Mean	8.142	Mean of log Data 1.301
Median	10	SD of log Data 2.219
SD	4.007	
Coefficient of Variation	0.492	
Skewness	-1.916	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.504	Shapiro Wilk Test Statistic 0.5
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value 0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.33	95% H-UCL 2278
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 102.6
95% Adjusted-CLT UCL (Chen-1995)	9.384	97.5% Chebyshev (MVUE) UCL 135.9
95% Modified-t UCL (Johnson-1978)	10.22	99% Chebyshev (MVUE) UCL 201.5

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.607	Data do not follow a Discernable Distribution (0.05)
Theta Star	13.41	
MLE of Mean	8.142	
MLE of Standard Deviation	10.45	
nu star	13.36	
Approximate Chi Square Value (.05)	6.135	Nonparametric Statistics
Adjusted Level of Significance	0.0278	95% CLT UCL 10.13
Adjusted Chi Square Value	5.357	95% Jackknife UCL 10.33
		95% Standard Bootstrap UCL 9.96
Anderson-Darling Test Statistic	3.252	95% Bootstrap-t UCL 9.598
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL 9.38
Kolmogorov-Smirnov Test Statistic	0.517	95% Percentile Bootstrap UCL 9.905
Kolmogorov-Smirnov 5% Critical Value	0.265	95% BCA Bootstrap UCL 9.096
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 13.41
		97.5% Chebyshev(Mean, Sd) UCL 15.69
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 20.16
95% Approximate Gamma UCL	17.73	
95% Adjusted Gamma UCL	20.3	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 20.16

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.007	Minimum of Log Data -4.962
Maximum	0.0268	Maximum of Log Data -3.619
Mean	0.0169	Mean of log Data -4.119
Median	0.0169	SD of log Data 0.312
SD	0.00443	
Coefficient of Variation	0.262	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic 0.581
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value 0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.0193	95% H-UCL 0.0207
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.024
95% Adjusted-CLT UCL (Chen-1995)	0.0191	97.5% Chebyshev (MVUE) UCL 0.0271
95% Modified-t UCL (Johnson-1978)	0.0193	99% Chebyshev (MVUE) UCL 0.0331

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	9.697	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.00174	
MLE of Mean	0.0169	
MLE of Standard Deviation	0.00543	
nu star	213.3	
Approximate Chi Square Value (.05)	180.5	Nonparametric Statistics
Adjusted Level of Significance	0.0278	95% CLT UCL 0.0191
Adjusted Chi Square Value	175.6	95% Jackknife UCL 0.0193
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	2.426	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.446	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.0227
		97.5% Chebyshev(Mean, Sd) UCL 0.0252
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.0302
95% Approximate Gamma UCL	0.02	
95% Adjusted Gamma UCL	0.0205	

Potential UCL to Use Use 95% Student's-t UCL 0.0193
 or 95% Modified-t UCL 0.0193

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	6
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Raw Statistics

Minimum	6.95	Log-transformed Statistics	
Maximum	11.08	Minimum of Log Data	1.939
Mean	9.942	Maximum of Log Data	2.405
Median	11	Mean of log Data	2.282
SD	1.669	SD of log Data	0.186
Coefficient of Variation	0.168		
Skewness	-1.196		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.686	Shapiro Wilk Test Statistic	0.68
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.11
95% Adjusted-CLT UCL (Chen-1995)	10.58	95% Chebyshev (MVUE) UCL	12.39
95% Modified-t UCL (Johnson-1978)	10.82	97.5% Chebyshev (MVUE) UCL	13.45
		99% Chebyshev (MVUE) UCL	15.52

Gamma Distribution Test

k star (bias corrected)	24.94	Data Distribution	
Theta Star	0.399	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.942		
MLE of Standard Deviation	1.991		
nu star	548.7		
Approximate Chi Square Value (.05)	495.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	10.77
Adjusted Chi Square Value	487.1	95% Jackknife UCL	10.85
		95% Standard Bootstrap UCL	10.72
Anderson-Darling Test Statistic	1.759	95% Bootstrap-t UCL	10.69
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	10.58
Kolmogorov-Smirnov Test Statistic	0.381	95% Percentile Bootstrap UCL	10.66
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	10.57
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.14
		97.5% Chebyshev(Mean, Sd) UCL	13.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.95
95% Approximate Gamma UCL	11.01		
95% Adjusted Gamma UCL	11.2		

Potential UCL to Use

Use 95% Student's-t UCL	10.85
or 95% Modified-t UCL	10.82

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	12.5	Minimum of Log Data	2.526
Maximum	85	Maximum of Log Data	4.443
Mean	43	Mean of log Data	3.672
Median	39.09	SD of log Data	0.473
SD	18.06		
Coefficient of Variation	0.42		
Skewness	0.932		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.892
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Critical Value	0.85
Shapiro Wilk Critical Value	0.85		
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	52.87	95% H-UCL	60.59
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	71.05
95% Adjusted-CLT UCL (Chen-1995)	53.59	97.5% Chebyshev (MVUE) UCL	82.98
95% Modified-t UCL (Johnson-1978)	53.13	99% Chebyshev (MVUE) UCL	106.4

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.248	Data appear Normal at 5% Significance Level	
Theta Star	10.12		
MLE of Mean	43		
MLE of Standard Deviation	20.86		
nu star	93.45		
Approximate Chi Square Value (.05)	72.16	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	51.96
Adjusted Chi Square Value	69.11	95% Jackknife UCL	52.87
		95% Standard Bootstrap UCL	51.61
Anderson-Darling Test Statistic	0.414	95% Bootstrap-t UCL	55.58
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	62.39
Kolmogorov-Smirnov Test Statistic	0.186	95% Percentile Bootstrap UCL	51.63
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	53.65
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	66.74
		97.5% Chebyshev(Mean, Sd) UCL	77.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	97.18
95% Approximate Gamma UCL	55.69		
95% Adjusted Gamma UCL	58.15		

Potential UCL to Use

Use 95% Student's-t UCL 52.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	127.5	Minimum of Log Data	4.848
Maximum	1137	Maximum of Log Data	7.036
Mean	335.1	Mean of log Data	5.63
Median	228.4	SD of log Data	0.567
SD	278.2		
Coefficient of Variation	0.83		
Skewness	2.823		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.617	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	487.1	95% H-UCL	491.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	568.5
95% Adjusted-CLT UCL (Chen-1995)	549.3	97.5% Chebyshev (MVUE) UCL	675.1
95% Modified-t UCL (Johnson-1978)	499	99% Chebyshev (MVUE) UCL	884.5

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.148	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	156		
MLE of Mean	335.1		
MLE of Standard Deviation	228.7		
nu star	47.25		
Approximate Chi Square Value (.05)	32.48	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	473.1
Adjusted Chi Square Value	30.49	95% Jackknife UCL	487.1
		95% Standard Bootstrap UCL	467
Anderson-Darling Test Statistic	0.962	95% Bootstrap-t UCL	761.3
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	1008
Kolmogorov-Smirnov Test Statistic	0.203	95% Percentile Bootstrap UCL	486.4
Kolmogorov-Smirnov 5% Critical Value	0.257	95% BCA Bootstrap UCL	568.9
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	700.7
		97.5% Chebyshev(Mean, Sd) UCL	858.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1170
95% Approximate Gamma UCL	487.6		
95% Adjusted Gamma UCL	519.3		

Potential UCL to Use Use 95% Approximate Gamma UCL 487.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 5

Raw Statistics

	Log-transformed Statistics	
Minimum	12.8 Minimum of Log Data	2.549
Maximum	102.4 Maximum of Log Data	4.628
Mean	66.42 Mean of log Data	4.102
Median	65 SD of log Data	0.544
SD	22.76	
Coefficient of Variation	0.343	
Skewness	-0.796	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.738 Shapiro Wilk Test Statistic	0.582
Shapiro Wilk Critical Value	0.85 Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	78.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	102.9
95% Adjusted-CLT UCL (Chen-1995)	75.95	95% Chebyshev (MVUE) UCL	119.6
95% Modified-t UCL (Johnson-1978)	78.58	97.5% Chebyshev (MVUE) UCL	141.4
		99% Chebyshev (MVUE) UCL	184.4

Gamma Distribution Test

k star (bias corrected)	4.036	Data Distribution	
Theta Star	16.46	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	66.42		
MLE of Standard Deviation	33.06		
nu star	88.78		
Approximate Chi Square Value (.05)	68.06	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	77.71
Adjusted Chi Square Value	65.11	95% Jackknife UCL	78.86
		95% Standard Bootstrap UCL	77.4
Anderson-Darling Test Statistic	1.925	95% Bootstrap-t UCL	78.76
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	80.83
Kolmogorov-Smirnov Test Statistic	0.412	95% Percentile Bootstrap UCL	77.13
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	75.19
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	96.34
		97.5% Chebyshev(Mean, Sd) UCL	109.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	134.7
95% Approximate Gamma UCL	86.64		
95% Adjusted Gamma UCL	90.57		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 96.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0042	Minimum of Log Data	-5.473
Maximum	0.0406	Maximum of Log Data	-3.204
Mean	0.0224	Mean of log Data	-3.897
Median	0.0224	SD of log Data	0.552
SD	0.00814		
Coefficient of Variation	0.363		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic	0.529
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0268	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.035
95% Adjusted-CLT UCL (Chen-1995)	0.0264	95% Chebyshev (MVUE) UCL	0.0406
95% Modified-t UCL (Johnson-1978)	0.0268	97.5% Chebyshev (MVUE) UCL	0.0481
		99% Chebyshev (MVUE) UCL	0.0628

Gamma Distribution Test

k star (bias corrected)	3.884	Data Distribution	
Theta Star	0.00577	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0224		
MLE of Standard Deviation	0.0114		
nu star	85.45		
Approximate Chi Square Value (.05)	65.14	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.0264
Adjusted Chi Square Value	62.25	95% Jackknife UCL	0.0268
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.53	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0331
		97.5% Chebyshev(Mean, Sd) UCL	0.0377
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0468
95% Approximate Gamma UCL	0.0294		
95% Adjusted Gamma UCL	0.0307		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.0331

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

195-04.wst
 OFF
 95%
 2000

Arsenic

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 9

Raw Statistics

Minimum
 Maximum
 Mean
 Median
 SD
 Coefficient of Variation
 Skewness

Log-transformed Statistics

5 Minimum of Log Data 1.609
 11 Maximum of Log Data 2.398
 9.025 Mean of log Data 2.165
 10.61 SD of log Data 0.286
 2.31
 0.256
 -0.607

Relevant UCL Statistics

Normal Distribution Test Lognormal Distribution Test
 Shapiro Wilk Test Statistic 0.797 Shapiro Wilk Test Statistic 0.798
 Shapiro Wilk Critical Value 0.881 Shapiro Wilk Critical Value 0.881
 Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 10.08
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 9.906
 95% Modified-t UCL (Johnson-1978) 10.06

Assuming Lognormal Distribution

95% H-UCL 10.47
 95% Chebyshev (MVUE) UCL 11.99
 97.5% Chebyshev (MVUE) UCL 13.27
 99% Chebyshev (MVUE) UCL 15.77

Gamma Distribution Test

k star (bias corrected) 11.46
 Theta Star 0.787
 MLE of Mean 9.025
 MLE of Standard Deviation 2.666
 nu star 343.8

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.0324
 Adjusted Chi Square Value 297

Nonparametric Statistics

95% CLT UCL 10.01
 95% Jackknife UCL 10.08
 95% Standard Bootstrap UCL 9.953

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 0.736
 Kolmogorov-Smirnov Test Statistic 0.296
 Kolmogorov-Smirnov 5% Critical Value 0.221

95% Bootstrap-t UCL 9.974
 95% Hall's Bootstrap UCL 9.883
 95% Percentile Bootstrap UCL 9.955
 95% BCA Bootstrap UCL 9.929

Data not Gamma Distributed at 5% Significance Level

95% Chebyshev(Mean, Sd) UCL 11.62
 97.5% Chebyshev(Mean, Sd) UCL 12.75
 99% Chebyshev(Mean, Sd) UCL 14.96

Assuming Gamma Distribution

95% Approximate Gamma UCL 10.28
 95% Adjusted Gamma UCL 10.45

Potential UCL to Use

Use 95% Student's-t UCL 10.08
 or 95% Modified-t UCL 10.06

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 15

Raw Statistics

Minimum	31.26	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.442
Mean	44.48	Maximum of Log Data	4.443
Median	42.91	Mean of log Data	3.759
SD	13.76	SD of log Data	0.266
Coefficient of Variation	0.309		
Skewness	1.963		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.808	Shapiro Wilk Test Statistic	0.906
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	50.74	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	50.73
95% Adjusted-CLT UCL (Chen-1995)	52.25	95% Chebyshev (MVUE) UCL	57.75
95% Modified-t UCL (Johnson-1978)	51.04	97.5% Chebyshev (MVUE) UCL	63.56
		99% Chebyshev (MVUE) UCL	74.96

Gamma Distribution Test

k star (bias corrected)	11.21	Data Distribution	
Theta Star	3.97	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	44.48		
MLE of Standard Deviation	13.29		
nu star	336.2		
Approximate Chi Square Value (.05)	294.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	50.33
Adjusted Chi Square Value	289.9	95% Jackknife UCL	50.74
		95% Standard Bootstrap UCL	50.17
Anderson-Darling Test Statistic	0.564	95% Bootstrap-t UCL	53.84
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	76.04
Kolmogorov-Smirnov Test Statistic	0.159	95% Percentile Bootstrap UCL	50.53
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	52.44
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	59.97
		97.5% Chebyshev(Mean, Sd) UCL	66.67
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	79.83
95% Approximate Gamma UCL	50.75		
95% Adjusted Gamma UCL	51.58		

Potential UCL to Use Use 95% Approximate Gamma UCL 50.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	10	Minimum of Log Data	2.303
Maximum	86.9	Maximum of Log Data	4.465
Mean	56.32	Mean of log Data	3.847
Median	65	SD of log Data	0.758
SD	24.32		
Coefficient of Variation	0.432		
Skewness	-1.35		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.687	Shapiro Wilk Test Statistic	0.596
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	67.38	95% H-UCL	101.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	116.1
95% Adjusted-CLT UCL (Chen-1995)	64.31	97.5% Chebyshev (MVUE) UCL	140
95% Modified-t UCL (Johnson-1978)	67.02	99% Chebyshev (MVUE) UCL	186.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.336	Data do not follow a Discernable Distribution (0.05)	
Theta Star	24.11		
MLE of Mean	56.32		
MLE of Standard Deviation	36.85		
nu star	70.09		
Approximate Chi Square Value (.05)	51.82	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	66.65
Adjusted Chi Square Value	49.89	95% Jackknife UCL	67.38
		95% Standard Bootstrap UCL	66.31
Anderson-Darling Test Statistic	3.067	95% Bootstrap-t UCL	65.53
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	64.32
Kolmogorov-Smirnov Test Statistic	0.444	95% Percentile Bootstrap UCL	66.15
Kolmogorov-Smirnov 5% Critical Value	0.223	95% BCA Bootstrap UCL	64.59
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	83.69
		97.5% Chebyshev(Mean, Sd) UCL	95.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	118.8
95% Approximate Gamma UCL	76.18		
95% Adjusted Gamma UCL	79.13		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCI 83.69

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	0.025 Minimum of Log Data	-3.689
Maximum	10 Maximum of Log Data	2.303
Mean	7.262 Mean of log Data	0.767
Median	10 SD of log Data	2.617
SD	4.523	
Coefficient of Variation	0.623	
Skewness	-1.16	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.586 Shapiro Wilk Test Statistic	0.577
Shapiro Wilk Critical Value	0.881 Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	9.319 95% H-UCL	3800
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	143.4
95% Adjusted-CLT UCL (Chen-1995)	8.809 97.5% Chebyshev (MVUE) UCL	190.8
95% Modified-t UCL (Johnson-1978)	9.261 99% Chebyshev (MVUE) UCL	284.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.46 Data do not follow a Discernable Distribution (0.05)	
Theta Star	15.78	
MLE of Mean	7.262	
MLE of Standard Deviation	10.71	
nu star	13.8	
Approximate Chi Square Value (.05)	6.436 Nonparametric Statistics	
Adjusted Level of Significance	0.0324 95% CLT UCL	9.183
Adjusted Chi Square Value	5.827 95% Jackknife UCL	9.319
	95% Standard Bootstrap UCL	9.111
Anderson-Darling Test Statistic	3.695 95% Bootstrap-t UCL	9.037
Anderson-Darling 5% Critical Value	0.792 95% Hall's Bootstrap UCL	8.732
Kolmogorov-Smirnov Test Statistic	0.46 95% Percentile Bootstrap UCL	9.096
Kolmogorov-Smirnov 5% Critical Value	0.234 95% BCA Bootstrap UCL	8.671
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.35
	97.5% Chebyshev(Mean, Sd) UCL	14.55
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.88
95% Approximate Gamma UCL	15.57	
95% Adjusted Gamma UCL	17.2	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCI 18.88

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.27	Minimum of Log Data	-1.309
Maximum	0.42	Maximum of Log Data	-0.868
Mean	0.325	Mean of log Data	-1.128
Median	0.325	SD of log Data	0.0899
SD	0.0308		
Coefficient of Variation	0.0948		
Skewness	1.824		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.61	Shapiro Wilk Test Statistic	0.64
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.339	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.358
95% Adjusted-CLT UCL (Chen-1995)	0.342	97.5% Chebyshev (MVUE) UCL	0.372
95% Modified-t UCL (Johnson-1978)	0.34	99% Chebyshev (MVUE) UCL	0.4

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	102.9	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00316		
MLE of Mean	0.325		
MLE of Standard Deviation	0.032		
nu star	3086		
Approximate Chi Square Value (.05)	2958	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.338
Adjusted Chi Square Value	2943	95% Jackknife UCL	0.339
		95% Standard Bootstrap UCL	0.338
Anderson-Darling Test Statistic	2.836	95% Bootstrap-t UCL	0.342
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	0.413
Kolmogorov-Smirnov Test Statistic	0.422	95% Percentile Bootstrap UCL	0.338
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	0.341
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.36
		97.5% Chebyshev(Mean, Sd) UCL	0.375
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.404
95% Approximate Gamma UCL	0.339		
95% Adjusted Gamma UCL	0.341		

Potential UCL to Use

Use 95% Student's-t UCL 0.339
or 95% Modified-t UCL 0.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-05.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	5
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Raw Statistics

Minimum	6.12	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.812
Mean	9.422	Maximum of Log Data	2.398
Median	11	Mean of log Data	2.216
SD	2.156	SD of log Data	0.253
Coefficient of Variation	0.229		
Skewness	-0.794		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.716	Shapiro Wilk Test Statistic	0.718
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.67	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.15
95% Adjusted-CLT UCL (Chen-1995)	10.36	95% Chebyshev (MVUE) UCL	12.75
95% Modified-t UCL (Johnson-1978)	10.64	97.5% Chebyshev (MVUE) UCL	14.19
		99% Chebyshev (MVUE) UCL	17

Gamma Distribution Test

k star (bias corrected)	13.13	Data Distribution	
Theta Star	0.718	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.422		
MLE of Standard Deviation	2.6		
nu star	262.6		
Approximate Chi Square Value (.05)	226.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	10.54
Adjusted Chi Square Value	220.2	95% Jackknife UCL	10.67
		95% Standard Bootstrap UCL	10.43
Anderson-Darling Test Statistic	1.417	95% Bootstrap-t UCL	10.6
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	10.3
Kolmogorov-Smirnov Test Statistic	0.377	95% Percentile Bootstrap UCL	10.38
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	10.31
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.39
		97.5% Chebyshev(Mean, Sd) UCL	13.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.21
95% Approximate Gamma UCL	10.94		
95% Adjusted Gamma UCL	11.24		

Potential UCL to Use

Use 95% Student's-t UCL	10.67
or 95% Modified-t UCL	10.64

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations

10 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cesium-137 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 9

Raw Statistics

		Log-transformed Statistics	
Minimum	32.34	Minimum of Log Data	3.476
Maximum	85	Maximum of Log Data	4.443
Mean	53.85	Mean of log Data	3.939
Median	50.49	SD of log Data	0.317
SD	18.15		
Coefficient of Variation	0.337		
Skewness	1.012		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	64.37	95% H-UCL	66.72
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	77.44
95% Adjusted-CLT UCL (Chen-1995)	65.25	97.5% Chebyshev (MVUE) UCL	87.69
95% Modified-t UCL (Johnson-1978)	64.67	99% Chebyshev (MVUE) UCL	107.8

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	7.633	Data appear Normal at 5% Significance Level	
Theta Star	7.054		
MLE of Mean	53.85		
MLE of Standard Deviation	19.49		
nu star	152.7		
Approximate Chi Square Value (.05)	125.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	63.29
Adjusted Chi Square Value	120.8	95% Jackknife UCL	64.37
		95% Standard Bootstrap UCL	62.79
Anderson-Darling Test Statistic	0.448	95% Bootstrap-t UCL	70.19
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	91.03
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	63.04
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	64.22
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.86
		97.5% Chebyshev(Mean, Sd) UCL	89.69
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	111
95% Approximate Gamma UCL	65.71		
95% Adjusted Gamma UCL	68.07		

Potential UCL to Use Use 95% Student's-t UCL 64.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	3
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Raw Statistics	Log-transformed Statistics		
Minimum	12.4	Minimum of Log Data	2.518
Maximum	81.1	Maximum of Log Data	4.396
Mean	61.35	Mean of log Data	4.031
Median	65	SD of log Data	0.536
SD	17.93		
Coefficient of Variation	0.292		
Skewness	-2.632		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.537	Shapiro Wilk Test Statistic	0.449
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	71.74	95% H-UCL	97.57
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	112.2
95% Adjusted-CLT UCL (Chen-1995)	65.63	97.5% Chebyshev (MVUE) UCL	133.1
95% Modified-t UCL (Johnson-1978)	70.96	99% Chebyshev (MVUE) UCL	174.1

Gamma Distribution Test	Data Distribution		
k star (bias corrected)	4.262	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.4		
MLE of Mean	61.35		
MLE of Standard Deviation	29.72		
nu star	85.23		
Approximate Chi Square Value (.05)	64.95	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	70.68
Adjusted Chi Square Value	61.88	95% Jackknife UCL	71.74
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.714	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.51	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.06
		97.5% Chebyshev(Mean, Sd) UCL	96.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117.8
95% Approximate Gamma UCL	80.51		
95% Adjusted Gamma UCL	84.5		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	86.06
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	3
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Raw Statistics		Log-transformed Statistics	
Minimum	0.032	Minimum of Log Data	-3.442
Maximum		10 Maximum of Log Data	2.303
Mean	8.844	Mean of log Data	1.711
Median		10 SD of log Data	1.811
SD	3.136		
Coefficient of Variation	0.355		
Skewness	-3.025		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.44	Shapiro Wilk Test Statistic	0.381
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.66	95% H-UCL	563.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	74.78
95% Adjusted-CLT UCL (Chen-1995)	9.462	97.5% Chebyshev (MVUE) UCL	98.15
95% Modified-t UCL (Johnson-1978)	10.5	99% Chebyshev (MVUE) UCL	144.1

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.911	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.713		
MLE of Mean	8.844		
MLE of Standard Deviation	9.268		
nu star	18.21		
Approximate Chi Square Value (.05)	9.544	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	10.48
Adjusted Chi Square Value	8.474	95% Jackknife UCL	10.66
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.323	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.5	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.273	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.17
		97.5% Chebyshev(Mean, Sd) UCL	15.04
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.71
95% Approximate Gamma UCL	16.88		
95% Adjusted Gamma UCL	19.01		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.71

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-06.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	6
Raw Statistics		Log-transformed Statistics	
Minimum	4.4	Minimum of Log Data	1.482
Maximum	11	Maximum of Log Data	2.398
Mean	9.708	Mean of log Data	2.237
Median	11	SD of log Data	0.305
SD	2.288		
Coefficient of Variation	0.236		
Skewness	-1.813		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.643	Shapiro Wilk Test Statistic	0.612
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.89	95% H-UCL	11.72
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.55
95% Adjusted-CLT UCL (Chen-1995)	10.42	97.5% Chebyshev (MVUE) UCL	15.19
95% Modified-t UCL (Johnson-1978)	10.84	99% Chebyshev (MVUE) UCL	18.4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	10.64	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.912		
MLE of Mean	9.708		
MLE of Standard Deviation	2.976		
nu star	255.4		
Approximate Chi Square Value (.05)	219.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.79
Adjusted Chi Square Value	214.3	95% Jackknife UCL	10.89
		95% Standard Bootstrap UCL	10.7
Anderson-Darling Test Statistic	2.165	95% Bootstrap-t UCL	10.64
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10.51
Kolmogorov-Smirnov Test Statistic	0.347	95% Percentile Bootstrap UCL	10.66
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.47
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.59
		97.5% Chebyshev(Mean, Sd) UCL	13.83
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.28
95% Approximate Gamma UCL	11.3		
95% Adjusted Gamma UCL	11.57		
Potential UCL to Use		Use 95% Student's-t UCL	10.89
		or 95% Modified-t UCL	10.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum -0.014
 Maximum 0.298
 Mean 0.142
 Median 0.142
 SD 0.0665
 Coefficient of Variation 0.468
 Skewness 0

Log-transformed Statistics

Log Statistics Not Available

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test Lognormal Distribution Test
 Shapiro Wilk Test Statistic 0.6 Not Available
 Shapiro Wilk Critical Value 0.859
 Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.176

Assuming Normal Distribution

95% Student's-t UCL 0.176

Assuming Lognormal Distribution

95% H-UCL N/A
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen 1995) 0.174
 95% Modified-t UCL (Johnson-1978) 0.176

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.226

95% CLT UCL 0.174
 95% Jackknife UCL 0.176
 95% Standard Bootstrap UCL N/A
 95% Bootstrap-t UCL N/A
 95% Hall's Bootstrap UCL N/A
 95% Percentile Bootstrap UCL N/A
 95% BCA Bootstrap UCL N/A
 95% Chebyshev(Mean, Sd) UCL 0.226
 97.5% Chebyshev(Mean, Sd) UCL 0.262
 99% Chebyshev(Mean, Sd) UCL 0.333

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

Minimum	30.92	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.431
Mean	47.52	Maximum of Log Data	4.443
Median	43.2	Mean of log Data	3.827
SD	#####	SD of log Data	0.264
Coefficient of Variation	0.299		
Skewness	1.79		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.835	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	54.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	55.29
95% Adjusted-CLT UCL (Chen-1995)	56.55	95% Chebyshev (MVUE) UCL	63.28
95% Modified-t UCL (Johnson-1978)	55.25	97.5% Chebyshev (MVUE) UCL	70.15
		99% Chebyshev (MVUE) UCL	83.65

Gamma Distribution Test

k star (bias corrected)	11.05	Data Distribution	
Theta Star	4.302	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	47.52		
MLE of Standard Deviation	14.3		
nu star	265.1		
Approximate Chi Square Value (.05)	228.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	54.28
Adjusted Chi Square Value	223.2	95% Jackknife UCL	54.9
		95% Standard Bootstrap UCL	54.13
Anderson-Darling Test Statistic	0.522	95% Bootstrap-t UCL	59.4
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	85.7
Kolmogorov-Smirnov Test Statistic	0.229	95% Percentile Bootstrap UCL	54.55
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	55.94
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	65.43
		97.5% Chebyshev(Mean, Sd) UCL	73.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	88.4
95% Approximate Gamma UCL	55.16		
95% Adjusted Gamma UCL	56.44		

Potential UCL to Use

Use 95% Approximate Gamma UCL 55.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 7

Raw Statistics

Minimum	10	Minimum of Log Data	2.303
Maximum	98.09	Maximum of Log Data	4.586
Mean	63.58	Mean of log Data	3.971
Median	65	SD of log Data	0.767
SD	27.58		
Coefficient of Variation	0.434		
Skewness	-1.1		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.807	Shapiro Wilk Test Statistic	0.644
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	77.88	95% H-UCL	127.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	139
95% Adjusted-CLT UCL (Chen-1995)	73.98	97.5% Chebyshev (MVUE) UCL	169.2
95% Modified-t UCL (Johnson-1978)	77.46	99% Chebyshev (MVUE) UCL	228.6

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	2.243	Data Distribution	
Theta Star	28.35	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.58		
MLE of Standard Deviation	42.46		
nu star	53.83		
Approximate Chi Square Value (.05)	37.97	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	76.68
Adjusted Chi Square Value	35.95	95% Jackknife UCL	77.88
		95% Standard Bootstrap UCL	76.26
Anderson-Darling Test Statistic	1.822	95% Bootstrap-t UCL	76.04
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	74.09
Kolmogorov-Smirnov Test Statistic	0.426	95% Percentile Bootstrap UCL	75.82
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	74.14
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	98.29
		97.5% Chebyshev(Mean, Sd) UCL	113.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	142.8
95% Approximate Gamma UCL	90.13		
95% Adjusted Gamma UCL	95.21		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 98.29

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

Minimum	0.033	Log-transformed Statistics	
Maximum	10.01	Minimum of Log Data	-3.411
Mean	8.34	Maximum of Log Data	2.304
Median	10	Mean of log Data	1.353
SD	3.88	SD of log Data	2.218
Coefficient of Variation	0.465		
Skewness	-2.055		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.465	Shapiro Wilk Test Statistic	0.465
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.35	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1724
95% Adjusted-CLT UCL (Chen-1995)	9.472	95% Chebyshev (MVUE) UCL	110.2
95% Modified-t UCL (Johnson-1978)	10.24	97.5% Chebyshev (MVUE) UCL	145.9
		99% Chebyshev (MVUE) UCL	216.1

Gamma Distribution Test

k star (bias corrected)	0.637	Data Distribution	
Theta Star	13.08	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.34		
MLE of Standard Deviation	10.45		
nu star	15.3		

Approximate Chi Square Value (.05)	7.469	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.18
Adjusted Chi Square Value	6.65	95% Jackknife UCL	10.35
		95% Standard Bootstrap UCL	10.02
Anderson-Darling Test Statistic	3.778	95% Bootstrap-t UCL	9.654
Anderson-Darling 5% Critical Value	0.765	95% Hall's Bootstrap UCL	9.47
Kolmogorov-Smirnov Test Statistic	0.54	95% Percentile Bootstrap UCL	10
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	9.172
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.22
		97.5% Chebyshev(Mean, Sd) UCL	15.33
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.48
95% Approximate Gamma UCL	17.08		
95% Adjusted Gamma UCL	19.18		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 19.48

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	0.0051	Log-transformed Statistics	
Maximum	0.248	Minimum of Log Data	-5.279
Mean	0.126	Maximum of Log Data	-1.396
Median	0.126	Mean of log Data	-2.28
SD	0.0517	SD of log Data	0.964
Coefficient of Variation	0.409		
Skewness	#####		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.442
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.153	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.373
95% Adjusted-CLT UCL (Chen-1995)	0.151	95% Chebyshev (MVUE) UCL	0.355
95% Modified-t UCL (Johnson-1978)	0.153	97.5% Chebyshev (MVUE) UCL	0.441
		99% Chebyshev (MVUE) UCL	0.611

Gamma Distribution Test

k star (bias corrected)	1.945	Data Distribution	
Theta Star	0.065	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.126		
MLE of Standard Deviation	0.0906		
nu star	46.67		
Approximate Chi Square Value (.05)	31.99	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.151
Adjusted Chi Square Value	30.15	95% Jackknife UCL	0.153
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.108	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.5	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.191
		97.5% Chebyshev(Mean, Sd) UCL	0.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.275
95% Approximate Gamma UCL	0.184		
95% Adjusted Gamma UCL	0.196		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.191

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-07.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	6.6	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.887
Mean	9.845	Maximum of Log Data	2.398
Median	11	Mean of log Data	2.27
SD	1.769	SD of log Data	0.199
Coefficient of Variation	0.18		
Skewness	-1.058		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.678	Shapiro Wilk Test Statistic	0.682
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.76	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.03
95% Adjusted-CLT UCL (Chen-1995)	10.52	95% Chebyshev (MVUE) UCL	12.33
95% Modified-t UCL (Johnson-1978)	10.74	97.5% Chebyshev (MVUE) UCL	13.41
		99% Chebyshev (MVUE) UCL	15.51

Gamma Distribution Test

k star (bias corrected)	22.28	Data Distribution	
Theta Star	0.442	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.845		
MLE of Standard Deviation	2.086		
nu star	534.7		
Approximate Chi Square Value (.05)	482	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.69
Adjusted Chi Square Value	474.4	95% Jackknife UCL	10.76
		95% Standard Bootstrap UCL	10.6
Anderson-Darling Test Statistic	1.949	95% Bootstrap-t UCL	10.67
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	10.51
Kolmogorov-Smirnov Test Statistic	0.417	95% Percentile Bootstrap UCL	10.58
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	10.55
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.07
		97.5% Chebyshev(Mean, Sd) UCL	13.03
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.93
95% Approximate Gamma UCL	10.92		
95% Adjusted Gamma UCL	11.1		

Potential UCL to Use

	Use 95% Student's-t UCL	10.76
	or 95% Modified-t UCL	10.74

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	34.18	Minimum of Log Data	3.532
Maximum	61.47	Maximum of Log Data	4.119
Mean	42.52	Mean of log Data	3.73
Median	37.53	SD of log Data	0.205
SD	9.359		
Coefficient of Variation	0.22		
Skewness	1.114		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.823	Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	47.37	95% H-UCL	47.69
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	53.47
95% Adjusted-CLT UCL (Chen-1995)	47.89	97.5% Chebyshev (MVUE) UCL	58.22
95% Modified-t UCL (Johnson-1978)	47.52	99% Chebyshev (MVUE) UCL	67.56

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	18.78	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.264		
MLE of Mean	42.52		
MLE of Standard Deviation	9.811		
nu star	450.7		
Approximate Chi Square Value (.05)	402.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	46.96
Adjusted Chi Square Value	395.5	95% Jackknife UCL	47.37
		95% Standard Bootstrap UCL	46.9
Anderson-Darling Test Statistic	0.868	95% Bootstrap-t UCL	49.75
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	47.93
Kolmogorov-Smirnov Test Statistic	0.266	95% Percentile Bootstrap UCL	46.96
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	47.93
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	54.3
		97.5% Chebyshev(Mean, Sd) UCL	59.39
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	69.4
95% Approximate Gamma UCL	47.61		
95% Adjusted Gamma UCL	48.45		

Potential UCL to Use

Use 95% Student's-t UCL 47.37
or 95% Modified-t UCL 47.52

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

		Log-transformed Statistics	
Minimum	7.3	Minimum of Log Data	1.988
Maximum	13.9	Maximum of Log Data	2.632
Mean	10.6	Mean of log Data	2.352
Median	10.6	SD of log Data	0.139
SD	1.407		
Coefficient of Variation	0.133		
Skewness	5.84E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.587
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.33	95% H-UCL	11.44
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.46
95% Adjusted-CLT UCL (Chen-1995)	11.27	97.5% Chebyshev (MVUE) UCL	13.26
95% Modified-t UCL (Johnson-1978)	11.33	99% Chebyshev (MVUE) UCL	14.84

Gamma Distribution Test

k star (bias corrected)	44.32	Data Distribution	
Theta Star	0.239	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.6		
MLE of Standard Deviation	1.592		
nu star	1064		

Approximate Chi Square Value (.05)	989	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.27
Adjusted Chi Square Value	978	95% Jackknife UCL	11.33

		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.73	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.434	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.37
		97.5% Chebyshev(Mean, Sd) UCL	13.14
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.64
95% Approximate Gamma UCL	11.4		
95% Adjusted Gamma UCL	11.53		

Potential UCL to Use	Use 95% Student's-t UCL	11.33
	or 95% Modified-t UCL	11.33

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.032	Minimum of Log Data	-3.442
Maximum		10 Maximum of Log Data	2.303
Mean	8.177	Mean of log Data	1.332
Median		10 SD of log Data	2.217
SD	3.844		
Coefficient of Variation	0.47		
Skewness	-1.97		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.524	Shapiro Wilk Test Statistic	0.478
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.17	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1675
95% Adjusted-CLT UCL (Chen-1995)	9.328	95% Chebyshev (MVUE) UCL	107.7
95% Modified-t UCL (Johnson-1978)	10.07	97.5% Chebyshev (MVUE) UCL	142.5
		99% Chebyshev (MVUE) UCL	211

Gamma Distribution Test

k star (bias corrected)	0.637	Data Distribution	
Theta Star	12.84	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.177		
MLE of Standard Deviation	10.25		
nu star	15.28		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.029	Nonparametric Statistics	
Adjusted Chi Square Value	6.64	95% CLT UCL	10
		95% Jackknife UCL	10.17
		95% Standard Bootstrap UCL	9.856

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.556	95% Bootstrap-t UCL	9.661
Anderson-Darling 5% Critical Value	0.765	95% Hall's Bootstrap UCL	9.445
Kolmogorov-Smirnov Test Statistic	0.478	95% Percentile Bootstrap UCL	9.677
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	9.17
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.01
		97.5% Chebyshev(Mean, Sd) UCL	15.11
		99% Chebyshev(Mean, Sd) UCL	19.22

Assuming Gamma Distribution

95% Approximate Gamma UCL	16.76		
95% Adjusted Gamma UCL	18.82		

Potential UCL to Use

	Use 99% Chebyshev (Mean, Sd) UCL	19.22
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-08.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	8	Minimum of Log Data	2.079
Maximum	13.8	Maximum of Log Data	2.625
Mean	10.3	Mean of log Data	2.32
Median	11	SD of log Data	0.16
SD	1.651		
Coefficient of Variation	0.16		
Skewness	0.365		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.869	Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.15	95% H-UCL	11.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.38
95% Adjusted-CLT UCL (Chen-1995)	11.14	97.5% Chebyshev (MVUE) UCL	13.28
95% Modified-t UCL (Johnson-1978)	11.16	99% Chebyshev (MVUE) UCL	15.06

Gamma Distribution Test

k star (bias corrected)	32.09	Data Distribution	
Theta Star	0.321	Data appear Normal at 5% Significance Level	
MLE of Mean	10.3		
MLE of Standard Deviation	1.818		
nu star	770.1		
Approximate Chi Square Value (.05)	706.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.08
Adjusted Chi Square Value	697.5	95% Jackknife UCL	11.15
		95% Standard Bootstrap UCL	11.06
Anderson-Darling Test Statistic	0.828	95% Bootstrap-t UCL	11.18
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	11.28
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	11.02
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.08
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.38
		97.5% Chebyshev(Mean, Sd) UCL	13.27
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.04
95% Approximate Gamma UCL	11.22		
95% Adjusted Gamma UCL	11.37		

Potential UCL to Use

	Use 95% Student's-t UCL	11.15
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.58	Minimum of Log Data	-0.545
Maximum	0.74	Maximum of Log Data	-0.301
Mean	0.66	Mean of log Data	-0.417
Median	0.66	SD of log Data	0.052
SD	0.0341		
Coefficient of Variation	0.0517		
Skewness	-5.96E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.598
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.678	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.703
95% Adjusted-CLT UCL (Chen-1995)	0.676	97.5% Chebyshev (MVUE) UCL	0.722
95% Modified-t UCL (Johnson-1978)	0.678	99% Chebyshev (MVUE) UCL	0.759

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	304.2	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00217		
MLE of Mean	0.66		
MLE of Standard Deviation	0.0378		
nu star	7301		
Approximate Chi Square Value (.05)	7103	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.676
Adjusted Chi Square Value	7074	95% Jackknife UCL	0.678
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.716	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.423	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.703
		97.5% Chebyshev(Mean, Sd) UCL	0.721
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.758
95% Approximate Gamma UCL	0.678		
95% Adjusted Gamma UCL	0.681		

Potential UCL to Use	Use 95% Student's-t UCL	0.678
	or 95% Modified-t UCL	0.678

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.046	Minimum of Log Data	-3.079
Maximum	0.37	Maximum of Log Data	-0.994
Mean	0.208	Mean of log Data	-1.648
Median	0.208	SD of log Data	0.48
SD	0.0691		
Coefficient of Variation	0.332		
Skewness	-2.30E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.514
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.244	95% H-UCL	0.293
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.346
95% Adjusted-CLT UCL (Chen-1995)	0.241	97.5% Chebyshev (MVUE) UCL	0.403
95% Modified-t UCL (Johnson-1978)	0.244	99% Chebyshev (MVUE) UCL	0.515

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.001	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0416		
MLE of Mean	0.208		
MLE of Standard Deviation	0.093		
nu star	120		
Approximate Chi Square Value (.05)	95.72	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.241
Adjusted Chi Square Value	92.41	95% Jackknife UCL	0.244
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.86	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.468	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.295
		97.5% Chebyshev(Mean, Sd) UCL	0.333
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.406
95% Approximate Gamma UCL	0.261		
95% Adjusted Gamma UCL	0.27		

Potential UCL to Use	Use 95% Student's-t UCL	0.244
	or 95% Modified-t UCL	0.244

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	17.7 Minimum of Log Data	2.874
Maximum	67.93 Maximum of Log Data	4.218
Mean	45.1 Mean of log Data	3.758
Median	43.21 SD of log Data	0.352
SD	13.83	
Coefficient of Variation	0.307	
Skewness	0.0234	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.929 Shapiro Wilk Test Statistic	0.871
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	52.27 95% H-UCL	56.24
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	65.68
95% Adjusted-CLT UCL (Chen-1995)	51.69 97.5% Chebyshev (MVUE) UCL	74.47
95% Modified-t UCL (Johnson-1978)	52.27 99% Chebyshev (MVUE) UCL	91.74

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.601 Data appear Normal at 5% Significance Level	
Theta Star	5.933	
MLE of Mean	45.1	
MLE of Standard Deviation	16.36	
nu star	182.4	
Approximate Chi Square Value (.05)	152.2 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	51.66
Adjusted Chi Square Value	148 95% Jackknife UCL	52.27
	95% Standard Bootstrap UCL	51.55
Anderson-Darling Test Statistic	0.533 95% Bootstrap-t UCL	52.86
Anderson-Darling 5% Critical Value	0.73 95% Hall's Bootstrap UCL	53.37
Kolmogorov-Smirnov Test Statistic	0.198 95% Percentile Bootstrap UCL	51.41
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	51.25
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	62.5
	97.5% Chebyshev(Mean, Sd) UCL	70.03
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	84.81
95% Approximate Gamma UCL	54.06	
95% Adjusted Gamma UCL	55.6	

Potential UCL to Use Use 95% Student's-t UCL 52.27

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	7.6 Minimum of Log Data	2.028
Maximum	18.2 Maximum of Log Data	2.901
Mean	12.9 Mean of log Data	2.542
Median	12.9 SD of log Data	0.19
SD	2.26	
Coefficient of Variation	0.175	
Skewness	-1.34E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.578
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	14.07 95% H-UCL	14.36
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	16.01
95% Adjusted-CLT UCL (Chen-1995)	13.97 97.5% Chebyshev (MVUE) UCL	17.34
95% Modified-t UCL (Johnson-1978)	14.07 99% Chebyshev (MVUE) UCL	19.97

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	24.52 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.526	
MLE of Mean	12.9	
MLE of Standard Deviation	2.605	
nu star	588.5	
Approximate Chi Square Value (.05)	533.2 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	13.97
Adjusted Chi Square Value	525.2 95% Jackknife UCL	14.07
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.742 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.44 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	15.74
	97.5% Chebyshev(Mean, Sd) UCL	16.97
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	19.39
95% Approximate Gamma UCL	14.24	
95% Adjusted Gamma UCL	14.45	

Potential UCL to Use Use 95% Student's-t UCL 14.07
 or 95% Modified-t UCL 14.07

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 1.20E+01 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	159 Minimum of Log Data	5.069
Maximum	1180 Maximum of Log Data	7.073
Mean	331.6 Mean of log Data	5.615
Median	244.7 SD of log Data	0.558
SD	285	
Coefficient of Variation	0.86	
Skewness	2.837	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.583 Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	479.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	465.6
95% Adjusted-CLT UCL (Chen-1995)	538.9	95% Chebyshev (MVUE) UCL	544.5
95% Modified-t UCL (Johnson-1978)	490.5	97.5% Chebyshev (MVUE) UCL	643.4
		99% Chebyshev (MVUE) UCL	837.6

Gamma Distribution Test

k star (bias corrected)	2.154	Data Distribution	
Theta Star	153.9	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	331.6		
MLE of Standard Deviation	225.9		
nu star	51.7		
Approximate Chi Square Value (.05)	36.18	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	466.9
Adjusted Chi Square Value	34.21	95% Jackknife UCL	479.3
		95% Standard Bootstrap UCL	460.6
Anderson-Darling Test Statistic	1.413	95% Bootstrap-t UCL	1020
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	1175
Kolmogorov-Smirnov Test Statistic	0.308	95% Percentile Bootstrap UCL	484.6
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	541.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	690.2
		97.5% Chebyshev(Mean, Sd) UCL	845.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1150
95% Approximate Gamma UCL	473.7		
95% Adjusted Gamma UCL	501		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 690.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics	
Minimum	12.4 Minimum of Log Data	2.518
Maximum	91.1 Maximum of Log Data	4.512
Mean	60.73 Mean of log Data	3.986
Median	65 SD of log Data	0.605
SD	22.69	
Coefficient of Variation	0.374	
Skewness	-1.381	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.748 Shapiro Wilk Test Statistic	0.633
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	72.49 95% H-UCL	97.98
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	113.5
95% Adjusted-CLT UCL (Chen-1995)	68.71 97.5% Chebyshev (MVUE) UCL	135.2
95% Modified-t UCL (Johnson-1978)	72.06 99% Chebyshev (MVUE) UCL	177.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.29 Data do not follow a Discernable Distribution (0.05)	
Theta Star	18.46	
MLE of Mean	60.73	
MLE of Standard Deviation	33.48	
nu star	78.95	
Approximate Chi Square Value (.05)	59.48 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	71.5
Adjusted Chi Square Value	56.91 95% Jackknife UCL	72.49
	95% Standard Bootstrap UCL	70.84
Anderson-Darling Test Statistic	2.099 95% Bootstrap-t UCL	70.2
Anderson-Darling 5% Critical Value	0.735 95% Hall's Bootstrap UCL	69.14
Kolmogorov-Smirnov Test Statistic	0.452 95% Percentile Bootstrap UCL	70.32
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	68.57
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	89.28
	97.5% Chebyshev(Mean, Sd) UCL	101.6
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	125.9
95% Approximate Gamma UCL	80.61	
95% Adjusted Gamma UCL	84.25	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 89.28

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.033 Minimum of Log Data	-3.411
Maximum	10 Maximum of Log Data	2.303
Mean	9.045 Mean of log Data	1.813
Median	10 SD of log Data	1.646
SD	2.87	
Coefficient of Variation	0.317	
Skewness	-3.337	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.391 Shapiro Wilk Test Statistic	0.34
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.53 95% H-UCL	190.9
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	62.87
95% Adjusted-CLT UCL (Chen-1995)	9.555 97.5% Chebyshev (MVUE) UCL	81.75
95% Modified-t UCL (Johnson-1978)	10.4 99% Chebyshev (MVUE) UCL	118.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.127 Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.028	
MLE of Mean	9.045	
MLE of Standard Deviation	8.521	
nu star	27.04	
Approximate Chi Square Value (.05)	16.18 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	10.41
Adjusted Chi Square Value	14.91 95% Jackknife UCL	10.53
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.126 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.747 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.5 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.25 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.66
	97.5% Chebyshev(Mean, Sd) UCL	14.22
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	17.29
95% Approximate Gamma UCL	15.11	
95% Adjusted Gamma UCL	16.4	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.29

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.027 Minimum of Log Data	-3.612
Maximum	0.216 Maximum of Log Data	-1.534
Mean	0.121 Mean of log Data	-2.187
Median	0.121 SD of log Data	0.478
SD	0.0402	
Coefficient of Variation	0.331	
Skewness	-3.82E-15	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.514
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.142 95% H-UCL	0.171
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.201
95% Adjusted-CLT UCL (Chen-1995)	0.14 97.5% Chebyshev (MVUE) UCL	0.234
95% Modified-t UCL (Johnson-1978)	0.142 99% Chebyshev (MVUE) UCL	0.299

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	5.031 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0241	
MLE of Mean	0.121	
MLE of Standard Deviation	0.0541	
nu star	120.7	
Approximate Chi Square Value (.05)	96.36 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	0.14
Adjusted Chi Square Value	93.04 95% Jackknife UCL	0.142
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.86 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.468 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.172
	97.5% Chebyshev(Mean, Sd) UCL	0.194
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.237
95% Approximate Gamma UCL	0.152	
95% Adjusted Gamma UCL	0.157	

Potential UCL to Use Use 95% Student's-t UCL 0.142
 or 95% Modified-t UCL 0.142

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	31.6 Minimum of Log Data	3.453
Maximum	40.4 Maximum of Log Data	3.699
Mean	36 Mean of log Data	3.582
Median	36 SD of log Data	0.0525
SD	1.876	
Coefficient of Variation	0.0521	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.598
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	36.97 95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	38.38
95% Adjusted-CLT UCL (Chen-1995)	36.89 97.5% Chebyshev (MVUE) UCL	39.41
95% Modified-t UCL (Johnson-1978)	36.97 99% Chebyshev (MVUE) UCL	41.43

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	299.2 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.12	
MLE of Mean	36	
MLE of Standard Deviation	2.081	
nu star	7180	
Approximate Chi Square Value (.05)	6984 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	36.89
Adjusted Chi Square Value	6954 95% Jackknife UCL	36.97
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.716 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.423 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	38.36
	97.5% Chebyshev(Mean, Sd) UCL	39.38
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	41.39
95% Approximate Gamma UCL	37.01	
95% Adjusted Gamma UCL	37.17	

Potential UCL to Use	Use 95% Student's-t UCL	36.97
	or 95% Modified-t UCL	36.97

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-10.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	8
Raw Statistics		Log-transformed Statistics	
Minimum	2.8	Minimum of Log Data	1.03
Maximum	11	Maximum of Log Data	2.398
Mean	8.996	Mean of log Data	2.136
Median	9.725	SD of log Data	0.41
SD	2.622		
Coefficient of Variation	0.291		
Skewness	-1.51		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.791	Shapiro Wilk Test Statistic	0.697
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.35	95% H-UCL	11.84
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.93
95% Adjusted-CLT UCL (Chen-1995)	9.888	97.5% Chebyshev (MVUE) UCL	16
95% Modified-t UCL (Johnson-1978)	10.3	99% Chebyshev (MVUE) UCL	20.07
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.367	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.413		
MLE of Mean	8.996		
MLE of Standard Deviation	3.565		
nu star	152.8		
Approximate Chi Square Value (.05)	125.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.24
Adjusted Chi Square Value	121.4	95% Jackknife UCL	10.35
		95% Standard Bootstrap UCL	10.22
Anderson-Darling Test Statistic	1.304	95% Bootstrap-t UCL	10.07
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	9.942
Kolmogorov-Smirnov Test Statistic	0.272	95% Percentile Bootstrap UCL	10.1
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	9.934
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.29
		97.5% Chebyshev(Mean, Sd) UCL	13.72
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.53
95% Approximate Gamma UCL	10.98		
95% Adjusted Gamma UCL	11.32		
Potential UCL to Use		Use 95% Student's-t UCL	10.35
		or 95% Modified-t UCL	10.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

	Log-transformed Statistics	
Minimum	11.5 Minimum of Log Data	2.442
Maximum	54.96 Maximum of Log Data	4.007
Mean	37.44 Mean of log Data	3.569
Median	37.94 SD of log Data	0.387
SD	10.44	
Coefficient of Variation	0.279	
Skewness	-1.075	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.899 Shapiro Wilk Test Statistic	0.722
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	42.85 95% H-UCL	48.37
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	56.78
95% Adjusted-CLT UCL (Chen-1995)	41.39 97.5% Chebyshev (MVUE) UCL	64.91
95% Modified-t UCL (Johnson-1978)	42.69 99% Chebyshev (MVUE) UCL	80.88

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.148 Data appear Normal at 5% Significance Level	
Theta Star	5.237	
MLE of Mean	37.44	
MLE of Standard Deviation	14	
nu star	171.6	
Approximate Chi Square Value (.05)	142.3 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	42.39
Adjusted Chi Square Value	138.2 95% Jackknife UCL	42.85
	95% Standard Bootstrap UCL	42.28
Anderson-Darling Test Statistic	0.99 95% Bootstrap-t UCL	41.83
Anderson-Darling 5% Critical Value	0.73 95% Hall's Bootstrap UCL	41.92
Kolmogorov-Smirnov Test Statistic	0.261 95% Percentile Bootstrap UCL	41.68
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	41.33
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	50.57
	97.5% Chebyshev(Mean, Sd) UCL	56.26
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	67.42
95% Approximate Gamma UCL	45.14	
95% Adjusted Gamma UCL	46.47	

Potential UCL to Use

Use 95% Student's-t UCL 42.85

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics	Log-transformed Statistics	
Minimum	83.64 Minimum of Log Data	4.427
Maximum	892.3 Maximum of Log Data	6.794
Mean	265.7 Mean of log Data	5.414
Median	198.3 SD of log Data	0.554
SD	206.8	
Coefficient of Variation	0.778	
Skewness	2.917	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.612 Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	372.9	Assuming Lognormal Distribution	95% H-UCL	378.5
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL	443
95% Adjusted-CLT UCL (Chen-1995)	417.6		97.5% Chebyshev (MVUE) UCL	523
95% Modified-t UCL (Johnson-1978)	381.3		99% Chebyshev (MVUE) UCL	680.2

Gamma Distribution Test

k star (bias corrected)	2.402	Data Distribution	Data appear Lognormal at 5% Significance Level
Theta Star	110.6		
MLE of Mean	265.7		
MLE of Standard Deviation	171.5		
nu star	57.65		
Approximate Chi Square Value (.05)	41.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	363.9
Adjusted Chi Square Value	39.08	95% Jackknife UCL	372.9
		95% Standard Bootstrap UCL	361.3
Anderson-Darling Test Statistic	1.018	95% Bootstrap-t UCL	540.5
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	770.4
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	378.9
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	435.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	525.9
		97.5% Chebyshev(Mean, Sd) UCL	638.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	859.6
95% Approximate Gamma UCL	371.9		
95% Adjusted Gamma UCL	392		

Potential UCL to Use Use 95% H-UCL 378.5

ProUCL computes and outputs H-statistic based UCLs for historical reasons only. H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide. It is therefore recommended to avoid the use of H-statistic based 95% UCLs. Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics	Log-transformed Statistics		
Minimum	9.2	Minimum of Log Data	2.219
Maximum	79.83	Maximum of Log Data	4.38
Mean	62.34	Mean of log Data	4.039
Median	65	SD of log Data	0.577
SD	17.4		
Coefficient of Variation	0.279		
Skewness	-2.96		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.521	Shapiro Wilk Test Statistic	0.41
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	71.36	95% H-UCL	99.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	115.5
95% Adjusted-CLT UCL (Chen-1995)	66.01	97.5% Chebyshev (MVUE) UCL	136.8
95% Modified-t UCL (Johnson-1978)	70.64	99% Chebyshev (MVUE) UCL	178.8

Gamma Distribution Test	Data Distribution		
k star (bias corrected)	4.202	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.83		
MLE of Mean	62.34		
MLE of Standard Deviation	30.41		
nu star	100.9		
Approximate Chi Square Value (.05)	78.68	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	70.6
Adjusted Chi Square Value	75.7	95% Jackknife UCL	71.36
		95% Standard Bootstrap UCL	70.37
Anderson-Darling Test Statistic	3.252	95% Bootstrap-t UCL	68.79
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	67.29
Kolmogorov-Smirnov Test Statistic	0.512	95% Percentile Bootstrap UCL	68.76
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	68.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	84.23
		97.5% Chebyshev(Mean, Sd) UCL	93.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	112.3
95% Approximate Gamma UCL	79.9		
95% Adjusted Gamma UCL	83.05		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 84.23

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	0.051	Minimum of Log Data	-2.976
Maximum	13.11	Maximum of Log Data	2.573
Mean	8.844	Mean of log Data	1.468
Median		10 SD of log Data	2.074
SD	4.265		
Coefficient of Variation	0.482		
Skewness	-1.69		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.653	Shapiro Wilk Test Statistic	0.502
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.06	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	918
95% Adjusted-CLT UCL (Chen-1995)	10.23	95% Chebyshev (MVUE) UCL	94.85
95% Modified-t UCL (Johnson-1978)	10.96	97.5% Chebyshev (MVUE) UCL	125.1
		99% Chebyshev (MVUE) UCL	184.6

Gamma Distribution Test

k star (bias corrected)	0.678	Data Distribution	
Theta Star	13.04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.844		
MLE of Standard Deviation	10.74		
nu star	16.28		
Approximate Chi Square Value (.05)	8.158	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.87
Adjusted Chi Square Value	7.297	95% Jackknife UCL	11.06
		95% Standard Bootstrap UCL	10.78
Anderson-Darling Test Statistic	3.217	95% Bootstrap-t UCL	10.71
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	10.24
Kolmogorov-Smirnov Test Statistic	0.518	95% Percentile Bootstrap UCL	10.73
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL	10.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.21
		97.5% Chebyshev(Mean, Sd) UCL	16.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.1
95% Approximate Gamma UCL	17.65		
95% Adjusted Gamma UCL	19.73		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 21.1

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 195-11.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	5550 Minimum of Log Data	8.622
Maximum	28100 Maximum of Log Data	10.24
Mean	16825 Mean of log Data	9.681
Median	16825 SD of log Data	0.365
SD	4808	
Coefficient of Variation	0.286	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.539
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19317	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	21295
95% Adjusted-CLT UCL (Chen-1995)	19108	95% Chebyshev (MVUE) UCL	24923
95% Modified-t UCL (Johnson-1978)	19317	97.5% Chebyshev (MVUE) UCL	28346
		99% Chebyshev (MVUE) UCL	35070

Gamma Distribution Test

k star (bias corrected)	7.727	Data Distribution	
Theta Star	2178	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	16825		
MLE of Standard Deviation	6053		
nu star	185.4		
Approximate Chi Square Value (.05)	154.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	19108
Adjusted Chi Square Value	150.7	95% Jackknife UCL	19317
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.807	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.458	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22875
		97.5% Chebyshev(Mean, Sd) UCL	25492
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	30634
95% Approximate Gamma UCL	20137		
95% Adjusted Gamma UCL	20705		

Potential UCL to Use Use 95% Student's-t UCL 19317
 or 95% Modified-t UCL 19317

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 9

Raw Statistics

	Log-transformed Statistics	
Minimum	7.54 Minimum of Log Data	2.02
Maximum	24.6 Maximum of Log Data	3.203
Mean	10.53 Mean of log Data	2.294
Median	9.31 SD of log Data	0.327
SD	4.67	
Coefficient of Variation	0.444	
Skewness	2.871	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.601 Shapiro Wilk Test Statistic	0.742
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	12.95 95% H-UCL	12.68
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	14.75
95% Adjusted-CLT UCL (Chen-1995)	13.94 97.5% Chebyshev (MVUE) UCL	16.62
95% Modified-t UCL (Johnson-1978)	13.13 99% Chebyshev (MVUE) UCL	20.3

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.469 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.627	
MLE of Mean	10.53	
MLE of Standard Deviation	4.138	
nu star	155.3	
Approximate Chi Square Value (.05)	127.5 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	12.74
Adjusted Chi Square Value	123.6 95% Jackknife UCL	12.95
	95% Standard Bootstrap UCL	12.65
Anderson-Darling Test Statistic	1.312 95% Bootstrap-t UCL	16.45
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	21.01
Kolmogorov-Smirnov Test Statistic	0.32 95% Percentile Bootstrap UCL	12.96
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	13.96
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	16.4
	97.5% Chebyshev(Mean, Sd) UCL	18.94
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	23.94
95% Approximate Gamma UCL	12.82	
95% Adjusted Gamma UCL	13.22	

Potential UCL to Use

Use 95% Student's-t UCL 12.95
or 95% Modified-t UCL 13.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	105	Minimum of Log Data	4.654
Maximum	453	Maximum of Log Data	6.116
Mean	279	Mean of log Data	5.59
Median	279	SD of log Data	0.326
SD	74.19		
Coefficient of Variation	0.266		
Skewness	0		

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.548
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	317.5	95% H-UCL	342.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	397.7
95% Adjusted-CLT UCL (Chen-1995)	314.2	97.5% Chebyshev (MVUE) UCL	448.1
95% Modified-t UCL (Johnson-1978)	317.5	99% Chebyshev (MVUE) UCL	547.2

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	9.315	Data do not follow a Discernable Distribution (0.05)	
Theta Star	29.95		
MLE of Mean	279		
MLE of Standard Deviation	91.42		
nu star	223.5		
Approximate Chi Square Value (.05)	189.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	314.2
Adjusted Chi Square Value	185.2	95% Jackknife UCL	317.5
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.791	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.455	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	372.4
		97.5% Chebyshev(Mean, Sd) UCL	412.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	492.1
95% Approximate Gamma UCL	328.4		
95% Adjusted Gamma UCL	336.7		

Potential UCL to Use

Use 95% Student's-t UCL	317.5
or 95% Modified-t UCL	317.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.038	Minimum of Log Data	-3.27
Maximum	0.325	Maximum of Log Data	-1.124
Mean	0.182	Mean of log Data	-1.788
Median	0.182	SD of log Data	0.496
SD	0.0612		
Coefficient of Variation	0.337		
Skewness	8.26E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.511
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.213	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.26
95% Adjusted-CLT UCL (Chen-1995)	0.211	95% Chebyshev (MVUE) UCL	0.306
95% Modified-t UCL (Johnson-1978)	0.213	97.5% Chebyshev (MVUE) UCL	0.358
		99% Chebyshev (MVUE) UCL	0.46

Gamma Distribution Test

k star (bias corrected)	4.764	Data Distribution	
Theta Star	0.0381	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.182		
MLE of Standard Deviation	0.0832		
nu star	114.3		
Approximate Chi Square Value (.05)	90.64	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.211
Adjusted Chi Square Value	87.43	95% Jackknife UCL	0.213
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.868	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.47	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.258
		97.5% Chebyshev(Mean, Sd) UCL	0.292
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.357
95% Approximate Gamma UCL	0.229		
95% Adjusted Gamma UCL	0.237		

Potential UCL to Use	Use 95% Student's-t UCL	0.213
	or 95% Modified-t UCL	0.213

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	37.08	Minimum of Log Data	3.613
Maximum	85	Maximum of Log Data	4.443
Mean	49.56	Mean of log Data	3.875
Median	46.19	SD of log Data	0.238
SD	13.6		
Coefficient of Variation	0.274		
Skewness	1.882		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.801	Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	56.61	95% H-UCL	56.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	64.35
95% Adjusted-CLT UCL (Chen-1995)	58.29	97.5% Chebyshev (MVUE) UCL	70.81
95% Modified-t UCL (Johnson-1978)	56.96	99% Chebyshev (MVUE) UCL	83.49

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	13.33	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.717		
MLE of Mean	49.56		
MLE of Standard Deviation	13.57		
nu star	320		
Approximate Chi Square Value (.05)	279.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	56.01
Adjusted Chi Square Value	273.8	95% Jackknife UCL	56.61
		95% Standard Bootstrap UCL	55.61
Anderson-Darling Test Statistic	0.655	95% Bootstrap-t UCL	63.9
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	89.89
Kolmogorov-Smirnov Test Statistic	0.187	95% Percentile Bootstrap UCL	56.33
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	59.19
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	66.67
		97.5% Chebyshev(Mean, Sd) UCL	74.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	88.62
95% Approximate Gamma UCL	56.73		
95% Adjusted Gamma UCL	57.92		

Potential UCL to Use Use 95% Approximate Gamma UCL 56.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	4.5	Minimum of Log Data	1.504
Maximum	27.7	Maximum of Log Data	3.321
Mean	16.1	Mean of log Data	2.718
Median	16.1	SD of log Data	0.413
SD	4.946		
Coefficient of Variation	0.307		
Skewness	1.44E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.528
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	18.66	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	21.26
95% Adjusted-CLT UCL (Chen-1995)	18.45	95% Chebyshev (MVUE) UCL	25.02
95% Modified-t UCL (Johnson-1978)	18.66	97.5% Chebyshev (MVUE) UCL	28.76
		99% Chebyshev (MVUE) UCL	36.11

Gamma Distribution Test

k star (bias corrected)	6.324	Data Distribution	
Theta Star	2.546	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	16.1		
MLE of Standard Deviation	6.402		
nu star	151.8		
Approximate Chi Square Value (.05)	124.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	18.45
Adjusted Chi Square Value	120.5	95% Jackknife UCL	18.66
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.829	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.463	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.32
		97.5% Chebyshev(Mean, Sd) UCL	25.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	30.31
95% Approximate Gamma UCL	19.66		
95% Adjusted Gamma UCL	20.28		

Potential UCL to Use		Use 95% Student's-t UCL	18.66
		or 95% Modified-t UCL	18.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	10188	Minimum of Log Data	9.229
Maximum	46000	Maximum of Log Data	10.74
Mean	15918	Mean of log Data	9.573
Median	11735	SD of log Data	0.414
SD	9846		
Coefficient of Variation	0.619		
Skewness	3.028		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.56	Shapiro Wilk Test Statistic	0.725
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	21023	95% H-UCL	20213
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23785
95% Adjusted-CLT UCL (Chen-1995)	23248	97.5% Chebyshev (MVUE) UCL	27352
95% Modified-t UCL (Johnson-1978)	21437	99% Chebyshev (MVUE) UCL	34357

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.847	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4138		
MLE of Mean	15918		
MLE of Standard Deviation	8116		
nu star	92.32		
Approximate Chi Square Value (.05)	71.16	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	20593
Adjusted Chi Square Value	68.33	95% Jackknife UCL	21023
		95% Standard Bootstrap UCL	20390
Anderson-Darling Test Statistic	1.524	95% Bootstrap-t UCL	30762
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	37192
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	20977
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	24232
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28308
		97.5% Chebyshev(Mean, Sd) UCL	33669
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	44199
95% Approximate Gamma UCL	20651		
95% Adjusted Gamma UCL	21506		

Potential UCL to Use

Use 95% Student's-t UCL 21023
or 95% Modified-t UCL 21437

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	114.4	Minimum of Log Data	4.739
Maximum	1270	Maximum of Log Data	7.147
Mean	364.4	Mean of log Data	5.7
Median	287.5	SD of log Data	0.604
SD	303.8		
Coefficient of Variation	8.34E-01		
Skewness	2.775		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.653	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	521.9	95% H-UCL	542.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	629.3
95% Adjusted-CLT UCL (Chen-1995)	583.7	97.5% Chebyshev (MVUE) UCL	749
95% Modified-t UCL (Johnson-1978)	533.6	99% Chebyshev (MVUE) UCL	984.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.063	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	176.6		
MLE of Mean	364.4		
MLE of Standard Deviation	253.7		
nu star	49.51		
Approximate Chi Square Value (.05)	34.36	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	508.6
Adjusted Chi Square Value	32.44	95% Jackknife UCL	521.9
		95% Standard Bootstrap UCL	499.4
Anderson-Darling Test Statistic	0.713	95% Bootstrap-t UCL	783.8
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	1169
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL	522.5
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	603.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	746.6
		97.5% Chebyshev(Mean, Sd) UCL	912
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1237
95% Approximate Gamma UCL	525.1		
95% Adjusted Gamma UCL	556.2		

Potential UCL to Use Use 95% Approximate Gamma UCL 525.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	6.9 Minimum of Log Data	1.932
Maximum	83.79 Maximum of Log Data	4.428
Mean	59.55 Mean of log Data	3.966
Median	65 SD of log Data	0.663
SD	19.2	
Coefficient of Variation	0.322	
Skewness	-2.144	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.636 Shapiro Wilk Test Statistic	0.489
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.5 95% H-UCL	105.4
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	120.1
95% Adjusted-CLT UCL (Chen-1995)	65 97.5% Chebyshev (MVUE) UCL	144.2
95% Modified-t UCL (Johnson-1978)	68.93 99% Chebyshev (MVUE) UCL	191.6

Gamma Distribution Test

k star (bias corrected)	3.276 Data do not follow a Discernable Distribution (0.05)	
Theta Star	18.18	
MLE of Mean	59.55	
MLE of Standard Deviation	32.9	
nu star	78.62	
Approximate Chi Square Value (.05)	59.19 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	68.66
Adjusted Chi Square Value	56.63 95% Jackknife UCL	69.5
	95% Standard Bootstrap UCL	68.2
Anderson-Darling Test Statistic	2.714 95% Bootstrap-t UCL	66.75
Anderson-Darling 5% Critical Value	0.735 95% Hall's Bootstrap UCL	66.14
Kolmogorov-Smirnov Test Statistic	0.468 95% Percentile Bootstrap UCL	66.57
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	65.35
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	83.7
	97.5% Chebyshev(Mean, Sd) UCL	94.16
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	114.7
95% Approximate Gamma UCL	79.09	
95% Adjusted Gamma UCL	82.68	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 83.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.051	Minimum of Log Data	-2.976
Maximum	10	Maximum of Log Data	2.303
Mean	8.213	Mean of log Data	1.536
Median	10	SD of log Data	1.778
SD	3.801		
Coefficient of Variation	0.463		
Skewness	-1.984		

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.521	Shapiro Wilk Test Statistic	0.501
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.18	95% H-UCL	249
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	59.82
95% Adjusted-CLT UCL (Chen-1995)	9.346	97.5% Chebyshev (MVUE) UCL	78.19
95% Modified-t UCL (Johnson-1978)	10.08	99% Chebyshev (MVUE) UCL	114.3

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.814	Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.08		
MLE of Mean	8.213		
MLE of Standard Deviation	9.1		
nu star	19.55		
Approximate Chi Square Value (.05)	10.52	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.02
Adjusted Chi Square Value	9.521	95% Jackknife UCL	10.18
		95% Standard Bootstrap UCL	9.909
Anderson-Darling Test Statistic	3.329	95% Bootstrap-t UCL	9.664
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	9.454
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	9.71
Kolmogorov-Smirnov 5% Critical Value	0.252	95% BCA Bootstrap UCL	9.187
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13
		97.5% Chebyshev(Mean, Sd) UCL	15.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.13
95% Approximate Gamma UCL	15.26		
95% Adjusted Gamma UCL	16.86		

Potential UCL to Use

	Use 99% Chebyshev (Mean, Sd) UCL	19.13
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.11 Minimum of Log Data	-2.207
Maximum	0.66 Maximum of Log Data	-0.416
Mean	0.385 Mean of log Data	-1.014
Median	0.385 SD of log Data	0.406
SD	0.117	
Coefficient of Variation	0.305	
Skewness	1.64E-15	

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.529
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	Assuming Lognormal Distribution	95% H-UCL	
0.446	95% Chebyshev (MVUE) UCL		0.505
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL		0.594
95% Adjusted-CLT UCL (Chen-1995)	97.5% Chebyshev (MVUE) UCL		0.682
95% Modified-t UCL (Johnson-1978)	99% Chebyshev (MVUE) UCL		0.855

Gamma Distribution Test

k star (bias corrected)	Data Distribution	
Theta Star	6.483 Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0594	
MLE of Standard Deviation	0.385	
nu star	0.151	
Approximate Chi Square Value (.05)	127.7 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	0.441
Adjusted Chi Square Value	123.9 95% Jackknife UCL	0.446
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.826 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.462 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.533
	97.5% Chebyshev(Mean, Sd) UCL	0.596
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.722
95% Approximate Gamma UCL	0.469	
95% Adjusted Gamma UCL	0.483	

Potential UCL to Use

Use 95% Student's-t UCL 0.446
or 95% Modified-t UCL 0.446

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0085	Minimum of Log Data	-4.768
Maximum	0.0409	Maximum of Log Data	-3.197
Mean	0.0247	Mean of log Data	-3.748
Median	0.0247	SD of log Data	0.352
SD	0.00691		
Coefficient of Variation	0.28		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.542
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0283	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0309
95% Adjusted-CLT UCL (Chen-1995)	0.028	95% Chebyshev (MVUE) UCL	0.0361
95% Modified-t UCL (Johnson-1978)	0.0283	97.5% Chebyshev (MVUE) UCL	0.041
		99% Chebyshev (MVUE) UCL	0.0505

Gamma Distribution Test

k star (bias corrected)	8.18	Data Distribution	
Theta Star	0.00302	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0247		
MLE of Standard Deviation	0.00864		
nu star	196.3		
Approximate Chi Square Value (.05)	164.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.028
Adjusted Chi Square Value	160.5	95% Jackknife UCL	0.0283
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.802	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0334
		97.5% Chebyshev(Mean, Sd) UCL	0.0372
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0445
95% Approximate Gamma UCL	0.0294		
95% Adjusted Gamma UCL	0.0302		

Potential UCL to Use		Use 95% Student's-t UCL	0.0283
		or 95% Modified-t UCL	0.0283

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	17.5 Minimum of Log Data	2.862
Maximum	79.7 Maximum of Log Data	4.378
Mean	48.6 Mean of log Data	3.84
Median	48.6 SD of log Data	0.339
SD	13.26	
Coefficient of Variation	0.273	
Skewness	0	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6 Shapiro Wilk Test Statistic	0.545
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	55.47	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	60.22
95% Adjusted-CLT UCL (Chen-1995)	54.9	95% Chebyshev (MVUE) UCL	70.18
95% Modified-t UCL (Johnson-1978)	55.47	97.5% Chebyshev (MVUE) UCL	79.33
		99% Chebyshev (MVUE) UCL	97.32

Gamma Distribution Test

k star (bias corrected)	8.721	Data Distribution	
Theta Star	5.573	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	48.6		
MLE of Standard Deviation	16.46		
nu star	209.3		
Approximate Chi Square Value (.05)	176.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	54.9
Adjusted Chi Square Value	172.3	95% Jackknife UCL	55.47
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.796	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.456	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	65.29
		97.5% Chebyshev(Mean, Sd) UCL	72.51
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	86.69
95% Approximate Gamma UCL	57.53		
95% Adjusted Gamma UCL	59.05		

Potential UCL to Use Use 95% Student's-t UCL 55.47
 or 95% Modified-t UCL 55.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-12.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	15	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	6.2	Minimum of Log Data	1.825
Maximum	11.5	Maximum of Log Data	2.442
Mean	9.99	Mean of log Data	2.287
Median	11	SD of log Data	0.187
SD	1.663		
Coefficient of Variation	0.166		
Skewness	-1.219		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.737	Shapiro Wilk Test Statistic	0.725
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.75	95% H-UCL	10.96
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.12
95% Adjusted-CLT UCL (Chen-1995)	10.55	97.5% Chebyshev (MVUE) UCL	13.03
95% Modified-t UCL (Johnson-1978)	10.72	99% Chebyshev (MVUE) UCL	14.83
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	26.7	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.374		
MLE of Mean	9.99		
MLE of Standard Deviation	1.933		
nu star	801		
Approximate Chi Square Value (.05)	736.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.7
Adjusted Chi Square Value	728.7	95% Jackknife UCL	10.75
		95% Standard Bootstrap UCL	10.68
Anderson-Darling Test Statistic	2.023	95% Bootstrap-t UCL	10.62
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	10.57
Kolmogorov-Smirnov Test Statistic	0.4	95% Percentile Bootstrap UCL	10.61
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	10.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.86
		97.5% Chebyshev(Mean, Sd) UCL	12.67
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.26
95% Approximate Gamma UCL	10.87		
95% Adjusted Gamma UCL	10.98		
Potential UCL to Use		Use 95% Student's-t UCL	10.75
		or 95% Modified-t UCL	10.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	0.51	Minimum of Log Data -0.673
Maximum	0.75	Maximum of Log Data -0.288
Mean	0.6	Mean of log Data -0.514
Median	0.6	SD of log Data 0.0789
SD	0.0494	
Coefficient of Variation	0.0824	
Skewness	1.659	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.602	Shapiro Wilk Test Statistic 0.625
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value 0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.622	95% H-UCL N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.653
95% Adjusted-CLT UCL (Chen-1995)	0.627	97.5% Chebyshev (MVUE) UCL 0.676
95% Modified-t UCL (Johnson-1978)	0.623	99% Chebyshev (MVUE) UCL 0.722

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	134.3	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.00447	
MLE of Mean	0.6	
MLE of Standard Deviation	0.0518	
nu star	4029	
Approximate Chi Square Value (.05)	3882	Nonparametric Statistics
Adjusted Level of Significance	0.0324	95% CLT UCL 0.621
Adjusted Chi Square Value	3865	95% Jackknife UCL 0.622
		95% Standard Bootstrap UCL 0.621
Anderson-Darling Test Statistic	3.005	95% Bootstrap-t UCL 0.624
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL 0.746
Kolmogorov-Smirnov Test Statistic	0.423	95% Percentile Bootstrap UCL 0.62
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL 0.624
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.656
		97.5% Chebyshev(Mean, Sd) UCL 0.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.727
95% Approximate Gamma UCL	0.623	
95% Adjusted Gamma UCL	0.625	

Potential UCL to Use Use 95% Student's-t UCL 0.622
 or 95% Modified-t UCL 0.623

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	12.9	Minimum of Log Data	2.557
Maximum	85	Maximum of Log Data	4.443
Mean	55.49	Mean of log Data	3.937
Median	49.29	SD of log Data	0.458
SD	19.76		
Coefficient of Variation	0.356		
Skewness	-0.00288		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Test Statistic	0.775
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.48	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	72.99
95% Adjusted-CLT UCL (Chen-1995)	63.88	95% Chebyshev (MVUE) UCL	86.43
95% Modified-t UCL (Johnson-1978)	64.48	97.5% Chebyshev (MVUE) UCL	99.36
		99% Chebyshev (MVUE) UCL	124.8

Gamma Distribution Test

k star (bias corrected)	5.251	Data Distribution	
Theta Star	10.57	Data appear Normal at 5% Significance Level	
MLE of Mean	55.49		
MLE of Standard Deviation	24.22		
nu star	157.5		
Approximate Chi Square Value (.05)	129.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	63.89
Adjusted Chi Square Value	126.4	95% Jackknife UCL	64.48
		95% Standard Bootstrap UCL	63.64
Anderson-Darling Test Statistic	0.902	95% Bootstrap-t UCL	64.77
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	65.04
Kolmogorov-Smirnov Test Statistic	0.229	95% Percentile Bootstrap UCL	63.72
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	63.41
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	77.74
		97.5% Chebyshev(Mean, Sd) UCL	87.36
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.3
95% Approximate Gamma UCL	67.5		
95% Adjusted Gamma UCL	69.17		

Potential UCL to Use

Use 95% Student's-t UCL 64.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	110.5	Minimum of Log Data	4.705
Maximum	978.6	Maximum of Log Data	6.886
Mean	350.6	Mean of log Data	5.668
Median	254.8	SD of log Data	0.609
SD	258.3		
Coefficient of Variation	0.737		
Skewness	1.85		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.741	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	468	95% H-UCL	497.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	588.9
95% Adjusted-CLT UCL (Chen-1995)	494.3	97.5% Chebyshev (MVUE) UCL	695.1
95% Modified-t UCL (Johnson-1978)	473.4	99% Chebyshev (MVUE) UCL	903.7

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.255	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	155.5		
MLE of Mean	350.6		
MLE of Standard Deviation	233.5		
nu star	67.64		
Approximate Chi Square Value (.05)	49.71	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	460.3
Adjusted Chi Square Value	47.82	95% Jackknife UCL	468
		95% Standard Bootstrap UCL	457.1
Anderson-Darling Test Statistic	0.728	95% Bootstrap-t UCL	621.4
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	1138
Kolmogorov-Smirnov Test Statistic	0.199	95% Percentile Bootstrap UCL	464.5
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	485.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	641.3
		97.5% Chebyshev(Mean, Sd) UCL	767.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1014
95% Approximate Gamma UCL	477		
95% Adjusted Gamma UCL	495.9		

Potential UCL to Use

Use 95% Approximate Gamma UCL 477

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	9.7	Minimum of Log Data	2.272
Maximum	99.76	Maximum of Log Data	4.603
Mean	60.43	Mean of log Data	3.891
Median	65	SD of log Data	0.813
SD	27.95		
Coefficient of Variation	0.463		
Skewness	-1.029		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.817	Shapiro Wilk Test Statistic	0.66
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.14	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	116.3
95% Adjusted-CLT UCL (Chen-1995)	70.25	95% Chebyshev (MVUE) UCL	131.1
95% Modified-t UCL (Johnson-1978)	72.82	97.5% Chebyshev (MVUE) UCL	159.1
		99% Chebyshev (MVUE) UCL	214.2

Gamma Distribution Test

k star (bias corrected)	2.071	Data Distribution	
Theta Star	29.18	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	60.43		
MLE of Standard Deviation	41.99		
nu star	62.12		
Approximate Chi Square Value (.05)	44.99	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	72.3
Adjusted Chi Square Value	43.2	95% Jackknife UCL	73.14
		95% Standard Bootstrap UCL	72.11
Anderson-Darling Test Statistic	2.22	95% Bootstrap-t UCL	70.98
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	70.38
Kolmogorov-Smirnov Test Statistic	0.387	95% Percentile Bootstrap UCL	70.9
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	70.32
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	91.89
		97.5% Chebyshev(Mean, Sd) UCL	105.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	132.2
95% Approximate Gamma UCL	83.43		
95% Adjusted Gamma UCL	86.89		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 91.89

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 4

Raw Statistics	Log-transformed Statistics	
Minimum	25.6	Minimum of Log Data 3.243
Maximum	42.4	Maximum of Log Data 3.747
Mean	35.3	Mean of log Data 3.559
Median	35.3	SD of log Data 0.101
SD	3.287	
Coefficient of Variation	0.0931	
Skewness	-1.247	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.598	Shapiro Wilk Test Statistic 0.567
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value 0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	36.79	95% H-UCL 37.02
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 39.31
95% Adjusted-CLT UCL (Chen-1995)	36.4	97.5% Chebyshev (MVUE) UCL 41.04
95% Modified-t UCL (Johnson-1978)	36.75	99% Chebyshev (MVUE) UCL 44.44

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	89.79	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.393	
MLE of Mean	35.3	
MLE of Standard Deviation	3.725	
nu star	2694	
Approximate Chi Square Value (.05)	2574	Nonparametric Statistics
Adjusted Level of Significance	0.0324	95% CLT UCL 36.7
Adjusted Chi Square Value	2560	95% Jackknife UCL 36.79
		95% Standard Bootstrap UCL 36.71
Anderson-Darling Test Statistic	3.21	95% Bootstrap-t UCL 36.55
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL 36.56
Kolmogorov-Smirnov Test Statistic	0.446	95% Percentile Bootstrap UCL 36.59
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL 36.29
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 39
		97.5% Chebyshev(Mean, Sd) UCL 40.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 43.74
95% Approximate Gamma UCL	36.94	
95% Adjusted Gamma UCL	37.15	

Potential UCL to Use Use 95% Student's-t UCL 36.79
 or 95% Modified-t UCL 36.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-13.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	9
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Raw Statistics

Minimum	4.8	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.569
Mean	8.875	Maximum of Log Data	2.398
Median	8.84	Mean of log Data	2.152
SD	2.138	SD of log Data	0.272
Coefficient of Variation	0.241		
Skewness	-0.647		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.873	Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.931	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.35
95% Adjusted-CLT UCL (Chen-1995)	9.736	95% Chebyshev (MVUE) UCL	11.85
95% Modified-t UCL (Johnson-1978)	9.914	97.5% Chebyshev (MVUE) UCL	13.13
		99% Chebyshev (MVUE) UCL	15.64

Gamma Distribution Test

k star (bias corrected)	12.43	Data Distribution	
Theta Star	0.714	Data appear Normal at 5% Significance Level	
MLE of Mean	8.875		
MLE of Standard Deviation	2.517		
nu star	323.2		
Approximate Chi Square Value (.05)	282.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.85
Adjusted Chi Square Value	277.1	95% Jackknife UCL	9.931
		95% Standard Bootstrap UCL	9.8
Anderson-Darling Test Statistic	0.716	95% Bootstrap-t UCL	9.832
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	9.732
Kolmogorov-Smirnov Test Statistic	0.22	95% Percentile Bootstrap UCL	9.795
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	9.73
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.46
		97.5% Chebyshev(Mean, Sd) UCL	12.58
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.77
95% Approximate Gamma UCL	10.15		
95% Adjusted Gamma UCL	10.35		

Potential UCL to Use

		Use 95% Student's-t UCL	9.931
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	8.6	Minimum of Log Data	2.152
Maximum	65.51	Maximum of Log Data	4.182
Mean	45.09	Mean of log Data	3.724
Median	46.86	SD of log Data	0.511
SD	14.49		
Coefficient of Variation	0.321		
Skewness	-1.107		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic	0.682
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	52.25	95% H-UCL	64.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	76.31
95% Adjusted-CLT UCL (Chen-1995)	50.38	97.5% Chebyshev (MVUE) UCL	89.13
95% Modified-t UCL (Johnson-1978)	52.05	99% Chebyshev (MVUE) UCL	114.3

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.708	Data appear Normal at 5% Significance Level	
Theta Star	9.577		
MLE of Mean	45.09		
MLE of Standard Deviation	20.78		
nu star	122.4		
Approximate Chi Square Value (.05)	97.87	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	51.7
Adjusted Chi Square Value	94.74	95% Jackknife UCL	52.25
		95% Standard Bootstrap UCL	51.41
Anderson-Darling Test Statistic	1.055	95% Bootstrap-t UCL	51.3
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	50.83
Kolmogorov-Smirnov Test Statistic	0.226	95% Percentile Bootstrap UCL	51.37
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	50.31
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	62.61
		97.5% Chebyshev(Mean, Sd) UCL	70.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	85.07
95% Approximate Gamma UCL	56.4		
95% Adjusted Gamma UCL	58.26		

Potential UCL to Use

Use 95% Student's-t UCL 52.25

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	11.3	Minimum of Log Data	2.425
Maximum	86.4	Maximum of Log Data	4.459
Mean	63.17	Mean of log Data	4.071
Median	65	SD of log Data	0.502
SD	16.76		
Coefficient of Variation	0.265		
Skewness	-2.633		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.551	Shapiro Wilk Test Statistic	0.424
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.45	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	90.29
95% Adjusted-CLT UCL (Chen-1995)	67.19	95% Chebyshev (MVUE) UCL	106.7
95% Modified-t UCL (Johnson-1978)	70.89	97.5% Chebyshev (MVUE) UCL	124.4
		99% Chebyshev (MVUE) UCL	159.2

Gamma Distribution Test

k star (bias corrected)	5.327	Data Distribution	
Theta Star	11.86	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.17		
MLE of Standard Deviation	27.37		
nu star	138.5		
Approximate Chi Square Value (.05)	112.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	70.82
Adjusted Chi Square Value	109	95% Jackknife UCL	71.45
		95% Standard Bootstrap UCL	70.6
Anderson-Darling Test Statistic	3.363	95% Bootstrap-t UCL	69.1
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	68.27
Kolmogorov-Smirnov Test Statistic	0.503	95% Percentile Bootstrap UCL	69.6
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	68.29
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	83.43
		97.5% Chebyshev(Mean, Sd) UCL	92.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	109.4
95% Approximate Gamma UCL	77.9		
95% Adjusted Gamma UCL	80.3		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 83.43

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.052	Minimum of Log Data	-2.957
Maximum	10	Maximum of Log Data	2.303
Mean	9.027	Mean of log Data	1.876
Median	10	SD of log Data	1.453
SD	2.743		
Coefficient of Variation	0.304		
Skewness	-3.405		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.414	Shapiro Wilk Test Statistic	0.333
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.38	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	88.15
95% Adjusted-CLT UCL (Chen-1995)	9.511	95% Chebyshev (MVUE) UCL	48.1
95% Modified-t UCL (Johnson-1978)	10.26	97.5% Chebyshev (MVUE) UCL	61.86
		99% Chebyshev (MVUE) UCL	88.88

Gamma Distribution Test

k star (bias corrected)	1.35	Data Distribution	
Theta Star	6.687	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.027		
MLE of Standard Deviation	7.769		
nu star	35.1		
Approximate Chi Square Value (.05)	22.54	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.28
Adjusted Chi Square Value	21.12	95% Jackknife UCL	10.38
		95% Standard Bootstrap UCL	10.22
Anderson-Darling Test Statistic	4.299	95% Bootstrap-t UCL	9.93
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	9.767
Kolmogorov-Smirnov Test Statistic	0.501	95% Percentile Bootstrap UCL	9.892
Kolmogorov-Smirnov 5% Critical Value	0.24	95% BCA Bootstrap UCL	9.802
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.34
		97.5% Chebyshev(Mean, Sd) UCL	13.78
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.6
95% Approximate Gamma UCL	14.05		
95% Adjusted Gamma UCL	15		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 12.34

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-14.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	9
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Raw Statistics

Minimum	6.38
Maximum	11
Mean	9.275
Median	9.22
SD	1.712
Coefficient of Variation	0.185
Skewness	-0.298

Log-transformed Statistics

Minimum of Log Data	1.853
Maximum of Log Data	2.398
Mean of log Data	2.211
SD of log Data	0.193

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Test Statistic	0.865
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.12
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	10.01
95% Modified-t UCL (Johnson-1978)	10.11

Assuming Lognormal Distribution

95% H-UCL	10.29
95% Chebyshev (MVUE) UCL	11.45
97.5% Chebyshev (MVUE) UCL	12.39
99% Chebyshev (MVUE) UCL	14.24

Gamma Distribution Test

k star (bias corrected)	23.27
Theta Star	0.399
MLE of Mean	9.275
MLE of Standard Deviation	1.923
nu star	605

Data Distribution

Data Follow Appr. Gamma Distribution at 5% Significance Level

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	541.4

Nonparametric Statistics

95% CLT UCL	10.06
95% Jackknife UCL	10.12
95% Standard Bootstrap UCL	10.03
95% Bootstrap-t UCL	10.08
95% Hall's Bootstrap UCL	9.977
95% Percentile Bootstrap UCL	10.02
95% BCA Bootstrap UCL	9.985
95% Chebyshev(Mean, Sd) UCL	11.34
97.5% Chebyshev(Mean, Sd) UCL	12.24
99% Chebyshev(Mean, Sd) UCL	14

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.22
95% Adjusted Gamma UCL	10.37

Potential UCL to Use

Use 95% Approximate Gamma UCL 10.22

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 11

Raw Statistics

Minimum	18.2	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.901
Mean	53.53	Maximum of Log Data	4.443
Median	52.74	Mean of log Data	3.901
SD	20.99	SD of log Data	0.432
Coefficient of Variation	0.392		
Skewness	0.361		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	70.01
95% Adjusted-CLT UCL (Chen-1995)	63.73	95% Chebyshev (MVUE) UCL	82.6
95% Modified-t UCL (Johnson-1978)	64	97.5% Chebyshev (MVUE) UCL	95.02
		99% Chebyshev (MVUE) UCL	119.4

Gamma Distribution Test

k star (bias corrected)	5.048	Data Distribution	
Theta Star	10.6	Data appear Normal at 5% Significance Level	
MLE of Mean	53.53		
MLE of Standard Deviation	23.82		
nu star	131.3		
Approximate Chi Square Value (.05)	105.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	63.1
Adjusted Chi Square Value	102.5	95% Jackknife UCL	63.9
		95% Standard Bootstrap UCL	62.57
Anderson-Darling Test Statistic	0.36	95% Bootstrap-t UCL	65.02
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	63.9
Kolmogorov-Smirnov Test Statistic	0.15	95% Percentile Bootstrap UCL	62.66
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	63.04
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.9
		97.5% Chebyshev(Mean, Sd) UCL	89.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	111.4
95% Approximate Gamma UCL	66.41		
95% Adjusted Gamma UCL	68.52		

Potential UCL to Use Use 95% Student's-t UCL 63.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.0174	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.051
Mean	8.195	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.34
SD	3.753	SD of log Data	2.261
Coefficient of Variation	0.458		
Skewness	-1.933		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.535	Shapiro Wilk Test Statistic	0.478
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.05	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1644
95% Adjusted-CLT UCL (Chen-1995)	9.311	95% Chebyshev (MVUE) UCL	120.1
95% Modified-t UCL (Johnson-1978)	9.957	97.5% Chebyshev (MVUE) UCL	159
		99% Chebyshev (MVUE) UCL	235.4

Gamma Distribution Test

k star (bias corrected)	0.651	Data Distribution	
Theta Star	12.59	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.195		
MLE of Standard Deviation	10.16		
nu star	16.92		
Approximate Chi Square Value (.05)	8.618	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.907
Adjusted Chi Square Value	7.787	95% Jackknife UCL	10.05
		95% Standard Bootstrap UCL	9.794
Anderson-Darling Test Statistic	3.786	95% Bootstrap-t UCL	9.704
Anderson-Darling 5% Critical Value	0.769	95% Hall's Bootstrap UCL	9.457
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	9.46
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	9.232
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.73
		97.5% Chebyshev(Mean, Sd) UCL	14.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.55
95% Approximate Gamma UCL	16.09		
95% Adjusted Gamma UCL	17.81		

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL	18.55
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Recommended UCL exceeds the maximum observation
 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 8

Raw Statistics

Minimum	7	Minimum of Log Data	1.946
Maximum	82.18	Maximum of Log Data	4.409
Mean	62.5	Mean of log Data	4.028
Median	65	SD of log Data	0.633
SD	17.95		
Coefficient of Variation	0.287		
Skewness	-2.706		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.644	Shapiro Wilk Test Statistic	0.446
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.38	95% H-UCL	104.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	121
95% Adjusted-CLT UCL (Chen-1995)	66.7	97.5% Chebyshev (MVUE) UCL	144.2
95% Modified-t UCL (Johnson-1978)	70.75	99% Chebyshev (MVUE) UCL	189.8

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	3.777	Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.55		
MLE of Mean	62.5		
MLE of Standard Deviation	32.16		
nu star	98.2		
Approximate Chi Square Value (.05)	76.34	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	70.69
Adjusted Chi Square Value	73.6	95% Jackknife UCL	71.38
		95% Standard Bootstrap UCL	70.5
Anderson-Darling Test Statistic	2.87	95% Bootstrap-t UCL	69.01
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	68
Kolmogorov-Smirnov Test Statistic	0.418	95% Percentile Bootstrap UCL	69.3
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	68.11
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	84.2
		97.5% Chebyshev(Mean, Sd) UCL	93.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	112
95% Approximate Gamma UCL	80.4		
95% Adjusted Gamma UCL	83.4		

Data Distribution

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 84.2
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.049	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.016
Mean	8.383	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.483
SD	3.71	SD of log Data	1.975
Coefficient of Variation	0.443		
Skewness	-2.148		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.481	Shapiro Wilk Test Statistic	0.455
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.22	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	463
95% Adjusted-CLT UCL (Chen-1995)	9.42	95% Chebyshev (MVUE) UCL	81.15
95% Modified-t UCL (Johnson-1978)	10.11	97.5% Chebyshev (MVUE) UCL	106.6
		99% Chebyshev (MVUE) UCL	156.7

Gamma Distribution Test

k star (bias corrected)	0.749	Data Distribution	
Theta Star	11.19	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.383		
MLE of Standard Deviation	9.684		
nu star	19.48		
Approximate Chi Square Value (.05)	10.47	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.08
Adjusted Chi Square Value	9.542	95% Jackknife UCL	10.22
		95% Standard Bootstrap UCL	9.989

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.008	95% Bootstrap-t UCL	9.666
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL	9.493
Kolmogorov-Smirnov Test Statistic	0.504	95% Percentile Bootstrap UCL	9.826
Kolmogorov-Smirnov 5% Critical Value	0.244	95% BCA Bootstrap UCL	9.235
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.87
		97.5% Chebyshev(Mean, Sd) UCL	14.81
		99% Chebyshev(Mean, Sd) UCL	18.62

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.6
95% Adjusted Gamma UCL	17.12

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 99% Chebyshev (Mean, Sd) UCL	18.62
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

195-15.wst
 OFF
 95%
 2000

Arsenic

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 6

Raw Statistics

Minimum
 Maximum
 Mean
 Median
 SD
 Coefficient of Variation
 Skewness

Log-transformed Statistics

4.4 Minimum of Log Data 1.482
 11 Maximum of Log Data 2.398
 9.524 Mean of log Data 2.214
 11 SD of log Data 0.319
 2.384
 0.25
 -1.493

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic
 Shapiro Wilk Critical Value
 Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.676 Shapiro Wilk Test Statistic 0.644
 0.874 Shapiro Wilk Critical Value 0.874
 Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995)
 95% Modified-t UCL (Johnson-1978)

Assuming Lognormal Distribution

10.65 95% H-UCL 11.4
 95% Chebyshev (MVUE) UCL 13.2
 10.3 97.5% Chebyshev (MVUE) UCL 14.76
 10.61 99% Chebyshev (MVUE) UCL 17.82

Gamma Distribution Test

k star (bias corrected)
 Theta Star
 MLE of Mean
 MLE of Standard Deviation
 nu star

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance
 Adjusted Chi Square Value

Nonparametric Statistics

241.4 95% CLT UCL 10.57
 0.0312 95% Jackknife UCL 10.65
 236.7 95% Standard Bootstrap UCL 10.51

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value
 Kolmogorov-Smirnov Test Statistic
 Kolmogorov-Smirnov 5% Critical Value

2.216 95% Bootstrap-t UCL 10.46
 0.734 95% Hall's Bootstrap UCL 10.32
 0.374 95% Percentile Bootstrap UCL 10.5
 0.229 95% BCA Bootstrap UCL 10.34

Data not Gamma Distributed at 5% Significance Level

95% Chebyshev(Mean, Sd) UCL 12.3
 97.5% Chebyshev(Mean, Sd) UCL 13.5
 99% Chebyshev(Mean, Sd) UCL 15.87

Assuming Gamma Distribution

95% Approximate Gamma UCL
 95% Adjusted Gamma UCL

Potential UCL to Use

Use 95% Student's-t UCL 10.65
 or 95% Modified-t UCL 10.61

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 3

Raw Statistics

Minimum
Maximum 0.358
Mean 0.179
Median 0.179
SD 0.0702
Coefficient of Variation 0.392
Skewness 0

Log-transformed Statistics

0 Log Statistics Not Available

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.551 Not Available

Shapiro Wilk Critical Value 0.874

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL

0.212

Assuming Lognormal Distribution

95% H-UCL

N/A

Assuming Normal Distribution

95% Student's-t UCL

0.212

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

0.21

95% Modified-t UCL (Johnson-1978)

0.212

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.261

95% CLT UCL

0.21

95% Jackknife UCL

0.212

95% Standard Bootstrap UCL

N/A

95% Bootstrap-t UCL

N/A

95% Hall's Bootstrap UCL

N/A

95% Percentile Bootstrap UCL

N/A

95% BCA Bootstrap UCL

N/A

95% Chebyshev(Mean, Sd) UCL

0.261

97.5% Chebyshev(Mean, Sd) UCL

0.296

99% Chebyshev(Mean, Sd) UCL

0.366

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 12

Raw Statistics

Minimum	8	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.079
Mean	46.8	Maximum of Log Data	4.443
Median	42.89	Mean of log Data	3.707
SD	23.33	SD of log Data	0.601
Coefficient of Variation	0.499		
Skewness	0.65		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.878	Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	57.84	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	70.56
95% Adjusted-CLT UCL (Chen-1995)	58.21	95% Chebyshev (MVUE) UCL	83.12
95% Modified-t UCL (Johnson-1978)	58.02	97.5% Chebyshev (MVUE) UCL	98.27
		99% Chebyshev (MVUE) UCL	128

Gamma Distribution Test

k star (bias corrected)	3.004	Data Distribution	
Theta Star	15.58	Data appear Normal at 5% Significance Level	
MLE of Mean	46.8		
MLE of Standard Deviation	27		
nu star	84.1		
Approximate Chi Square Value (.05)	63.96	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	57.05
Adjusted Chi Square Value	61.64	95% Jackknife UCL	57.84
		95% Standard Bootstrap UCL	56.72
Anderson-Darling Test Statistic	0.566	95% Bootstrap-t UCL	58.89
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	58.22
Kolmogorov-Smirnov Test Statistic	0.176	95% Percentile Bootstrap UCL	56.59
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	58.75
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	73.98
		97.5% Chebyshev(Mean, Sd) UCL	85.74
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	108.8
95% Approximate Gamma UCL	61.53		
95% Adjusted Gamma UCL	63.85		

Potential UCL to Use Use 95% Student's-t UCL 57.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 195-16.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Cesium-137

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	0.029 Minimum of Log Data	-3.54
Maximum	0.44 Maximum of Log Data	-0.821
Mean	0.21 Mean of log Data	-1.653
Median	0.21 SD of log Data	0.541
SD	0.077	
Coefficient of Variation	0.364	
Skewness	1.025	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.569 Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.244	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.297
95% Adjusted-CLT UCL (Chen-1995)	0.247	95% Chebyshev (MVUE) UCL	0.354
95% Modified-t UCL (Johnson-1978)	0.245	97.5% Chebyshev (MVUE) UCL	0.412
		99% Chebyshev (MVUE) UCL	0.526

Gamma Distribution Test

k star (bias corrected)	4.493	Data Distribution	
Theta Star	0.047	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.21		
MLE of Standard Deviation	0.099		
nu star	143.8		
Approximate Chi Square Value (.05)	117.1	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	0.242
Adjusted Chi Square Value	114.3	95% Jackknife UCL	0.244
		95% Standard Bootstrap UCL	0.241
Anderson-Darling Test Statistic	3.714	95% Bootstrap-t UCL	0.246
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.283
Kolmogorov-Smirnov Test Statistic	0.432	95% Percentile Bootstrap UCL	0.242
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	0.239
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.294
		97.5% Chebyshev(Mean, Sd) UCL	0.33
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.401
95% Approximate Gamma UCL	0.258		
95% Adjusted Gamma UCL	0.265		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.294

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 8

Raw Statistics

	Log-transformed Statistics	
Minimum	30.77 Minimum of Log Data	3.427
Maximum	85 Maximum of Log Data	4.443
Mean	65.06 Mean of log Data	4.102
Median	85 SD of log Data	0.412
SD	23.71	
Coefficient of Variation	0.364	
Skewness	-0.37	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.708 Shapiro Wilk Test Statistic	0.732
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	75.45	95% H-UCL	81.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	95.39
95% Adjusted-CLT UCL (Chen-1995)	74.22	97.5% Chebyshev (MVUE) UCL	108.4
95% Modified-t UCL (Johnson-1978)	75.36	99% Chebyshev (MVUE) UCL	133.8

Gamma Distribution Test

k star (bias corrected)	5.695	Data Distribution	
Theta Star	11.42	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	65.06		
MLE of Standard Deviation	27.26		
nu star	182.2		
Approximate Chi Square Value (.05)	152	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	74.81
Adjusted Chi Square Value	148.9	95% Jackknife UCL	75.45
		95% Standard Bootstrap UCL	74.53
Anderson-Darling Test Statistic	2.202	95% Bootstrap-t UCL	74.71
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	73.32
Kolmogorov-Smirnov Test Statistic	0.368	95% Percentile Bootstrap UCL	73.95
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	74.51
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	90.9
		97.5% Chebyshev(Mean, Sd) UCL	102.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	124
95% Approximate Gamma UCL	78		
95% Adjusted Gamma UCL	79.64		

Potential UCL to Use Use 95% Student's-t UCL 75.45
or 95% Modified-t UCL 75.36

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 16

Raw Statistics

	Log-transformed Statistics	
Minimum	147.3 Minimum of Log Data	4.993
Maximum	875 Maximum of Log Data	6.774
Mean	307.8 Mean of log Data	5.614
Median	240.3 SD of log Data	0.463
SD	182	
Coefficient of Variation	0.591	
Skewness	2.288	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.742 Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical Value	0.887 Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	387.6 95% H-UCL	388
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	459.7
95% Adjusted-CLT UCL (Chen-1995)	410.5 97.5% Chebyshev (MVUE) UCL	527.6
95% Modified-t UCL (Johnson-1978)	391.9 99% Chebyshev (MVUE) UCL	660.9

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.679 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	83.67	
MLE of Mean	307.8	
MLE of Standard Deviation	160.5	
nu star	117.7	
Approximate Chi Square Value (.05)	93.67 Nonparametric Statistics	
Adjusted Level of Significance	0.034 95% CLT UCL	382.7
Adjusted Chi Square Value	91.23 95% Jackknife UCL	387.6
	95% Standard Bootstrap UCL	380.6
Anderson-Darling Test Statistic	0.771 95% Bootstrap-t UCL	457.9
Anderson-Darling 5% Critical Value	0.742 95% Hall's Bootstrap UCL	665.2
Kolmogorov-Smirnov Test Statistic	0.184 95% Percentile Bootstrap UCL	385.8
Kolmogorov-Smirnov 5% Critical Value	0.216 95% BCA Bootstrap UCL	420.2
Data follow Appr. Gamma Distribution at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	506.2
	97.5% Chebyshev(Mean, Sd) UCL	592
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	760.6
95% Approximate Gamma UCL	386.9	
95% Adjusted Gamma UCL	397.2	

Potential UCL to Use Use 95% Approximate Gamma UCL 386.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	16	Number of Distinct Observations	4
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	0.036	Minimum of Log Data	-3.321
Maximum		10 Maximum of Log Data	2.303
Mean	9.092	Mean of log Data	1.918
Median		10 SD of log Data	1.401
SD	2.55		
Coefficient of Variation	0.28		
Skewness	-3.41		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.423	Shapiro Wilk Test Statistic	0.307
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.21	95% H-UCL	61.34
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	44.89
95% Adjusted-CLT UCL (Chen-1995)	9.559	97.5% Chebyshev (MVUE) UCL	57.25
95% Modified-t UCL (Johnson-1978)	10.12	99% Chebyshev (MVUE) UCL	81.53

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.568	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.799		
MLE of Mean	9.092		
MLE of Standard Deviation	7.261		
nu star	50.17		
Approximate Chi Square Value (.05)	34.9	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	10.14
Adjusted Chi Square Value	33.46	95% Jackknife UCL	10.21
		95% Standard Bootstrap UCL	10.1
Anderson-Darling Test Statistic	5.159	95% Bootstrap-t UCL	9.837
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	9.722
Kolmogorov-Smirnov Test Statistic	0.459	95% Percentile Bootstrap UCL	9.813
Kolmogorov-Smirnov 5% Critical Value	0.218	95% BCA Bootstrap UCL	9.714
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.87
		97.5% Chebyshev(Mean, Sd) UCL	13.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.43
95% Approximate Gamma UCL	13.07		
95% Adjusted Gamma UCL	13.63		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	11.87
Recommended UCL exceeds the maximum observation		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 10

Raw Statistics

Minimum	4.2	Minimum of Log Data	1.435
Maximum	85.86	Maximum of Log Data	4.453
Mean	61.36	Mean of log Data	3.918
Median	65	SD of log Data	0.868
SD	23.24		
Coefficient of Variation	0.379		
Skewness	-1.84		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.727	Shapiro Wilk Test Statistic	0.538
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.54	95% H-UCL	128.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	143.9
95% Adjusted-CLT UCL (Chen-1995)	68.06	97.5% Chebyshev (MVUE) UCL	175.4
95% Modified-t UCL (Johnson-1978)	71.1	99% Chebyshev (MVUE) UCL	237.2

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	2.214	Data Distribution	
Theta Star	27.71	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.36		
MLE of Standard Deviation	41.24		
nu star	70.84		
Approximate Chi Square Value (.05)	52.47	Nonparametric Statistics	
Adjusted Level of Significance	0.034	95% CLT UCL	70.91
Adjusted Chi Square Value	50.67	95% Jackknife UCL	71.54
		95% Standard Bootstrap UCL	70.62
Anderson-Darling Test Statistic	3.104	95% Bootstrap-t UCL	69.42
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	68.46
Kolmogorov-Smirnov Test Statistic	0.416	95% Percentile Bootstrap UCL	69.69
Kolmogorov-Smirnov 5% Critical Value	0.217	95% BCA Bootstrap UCL	68.64
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.68
		97.5% Chebyshev(Mean, Sd) UCL	97.64
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	119.2
95% Approximate Gamma UCL	82.85		
95% Adjusted Gamma UCL	85.79		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 86.68

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-17.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	23	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	4	Minimum of Log Data	1.386
Maximum	11	Maximum of Log Data	2.398
Mean	9.477	Mean of log Data	2.21
Median	11	SD of log Data	0.305
SD	2.346		
Coefficient of Variation	0.248		
Skewness	-1.197		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.691	Shapiro Wilk Test Statistic	0.683
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.32	95% H-UCL	10.75
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.21
95% Adjusted-CLT UCL (Chen-1995)	10.15	97.5% Chebyshev (MVUE) UCL	13.37
95% Modified-t UCL (Johnson-1978)	10.3	99% Chebyshev (MVUE) UCL	15.64
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	11.46	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.827		
MLE of Mean	9.477		
MLE of Standard Deviation	2.8		
nu star	527.1		
Approximate Chi Square Value (.05)	474.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	10.28
Adjusted Chi Square Value	471.3	95% Jackknife UCL	10.32
		95% Standard Bootstrap UCL	10.24
Anderson-Darling Test Statistic	3.39	95% Bootstrap-t UCL	10.21
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	10.14
Kolmogorov-Smirnov Test Statistic	0.393	95% Percentile Bootstrap UCL	10.25
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	10.14
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.61
		97.5% Chebyshev(Mean, Sd) UCL	12.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.34
95% Approximate Gamma UCL	10.52		
95% Adjusted Gamma UCL	10.6		
Potential UCL to Use		Use 95% Student's-t UCL	10.32
		or 95% Modified-t UCL	10.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 20

Raw Statistics

		Log-transformed Statistics	
Minimum	10.3	Minimum of Log Data	2.332
Maximum	120.8	Maximum of Log Data	4.794
Mean	57.07	Mean of log Data	3.942
Median	49.89	SD of log Data	0.497
SD	25.21		
Coefficient of Variation	0.442		
Skewness	0.866		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.875
Shapiro Wilk Test Statistic	0.902	Shapiro Wilk Critical Value	0.914
Shapiro Wilk Critical Value	0.914	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	66.09	95% H-UCL	71.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	85.11
95% Adjusted-CLT UCL (Chen-1995)	66.73	97.5% Chebyshev (MVUE) UCL	96.87
95% Modified-t UCL (Johnson-1978)	66.25	99% Chebyshev (MVUE) UCL	120

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.414	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	12.93		
MLE of Mean	57.07		
MLE of Standard Deviation	27.16		
nu star	203		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0389	Nonparametric Statistics	
Adjusted Chi Square Value	168.9	95% CLT UCL	65.71
		95% Jackknife UCL	66.09
		95% Standard Bootstrap UCL	65.46

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.824	95% Bootstrap-t UCL	67.83
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	67.44
Kolmogorov-Smirnov Test Statistic	0.175	95% Percentile Bootstrap UCL	66.03
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	66.16

Data follow Appr. Gamma Distribution at 5% Significance Level

		95% Chebyshev(Mean, Sd) UCL	79.98
		97.5% Chebyshev(Mean, Sd) UCL	89.89
		99% Chebyshev(Mean, Sd) UCL	109.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	67.73		
95% Adjusted Gamma UCL	68.58		

Potential UCL to Use

Use 95% Approximate Gamma UCL	67.73
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 23

Raw Statistics

		Log-transformed Statistics	
Minimum	170.6	Minimum of Log Data	5.139
Maximum	1418	Maximum of Log Data	7.257
Mean	401.5	Mean of log Data	5.821
Median	307.5	SD of log Data	0.572
SD	283.5		
Coefficient of Variation	0.706		
Skewness	2.284		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Test Statistic	0.756	Shapiro Wilk Critical Value	0.914
Shapiro Wilk Critical Value	0.914		
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	503	95% H-UCL	509
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	608.9
95% Adjusted-CLT UCL (Chen-1995)	528.8	97.5% Chebyshev (MVUE) UCL	701.9
95% Modified-t UCL (Johnson-1978)	507.7	99% Chebyshev (MVUE) UCL	884.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.661	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	150.9		
MLE of Mean	401.5		
MLE of Standard Deviation	246.1		
nu star	122.4		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0389	Nonparametric Statistics	
Adjusted Chi Square Value	96.26	95% CLT UCL	498.7
		95% Jackknife UCL	503

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.764	95% Standard Bootstrap UCL	493.8
Anderson-Darling 5% Critical Value	0.75	95% Bootstrap-t UCL	555.5
Kolmogorov-Smirnov Test Statistic	0.155	95% Hall's Bootstrap UCL	671.7
Kolmogorov-Smirnov 5% Critical Value	0.183	95% Percentile Bootstrap UCL	502.4

Data follow Appr. Gamma Distribution at 5% Significance Level

		95% BCA Bootstrap UCL	530.8
		95% Chebyshev(Mean, Sd) UCL	659.1
		97.5% Chebyshev(Mean, Sd) UCL	770.7
		99% Chebyshev(Mean, Sd) UCL	989.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	502.2		
95% Adjusted Gamma UCL	510.5		

Potential UCL to Use

Use 95% Approximate Gamma UCL 502.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics

Minimum	0.0205	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.887
Mean	8.596	10 Maximum of Log Data	2.303
Median	10	Mean of log Data	1.631
SD	3.392	10 SD of log Data	1.801
Coefficient of Variation	0.395		
Skewness	-2.241		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.452	Shapiro Wilk Test Statistic	0.423
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.81	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	108
95% Adjusted-CLT UCL (Chen-1995)	9.406	95% Chebyshev (MVUE) UCL	67.53
95% Modified-t UCL (Johnson-1978)	9.755	97.5% Chebyshev (MVUE) UCL	87.19
		99% Chebyshev (MVUE) UCL	125.8

Gamma Distribution Test

k star (bias corrected)	0.983	Data Distribution	
Theta Star	8.745	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.596		
MLE of Standard Deviation	8.67		
nu star	45.22	Nonparametric Statistics	
Approximate Chi Square Value (.05)	30.79	95% CLT UCL	9.759
Adjusted Level of Significance	0.0389	95% Jackknife UCL	9.81
Adjusted Chi Square Value	29.93	95% Standard Bootstrap UCL	9.713
Anderson-Darling Test Statistic	7.006	95% Bootstrap-t UCL	9.508
Anderson-Darling 5% Critical Value	0.768	95% Hall's Bootstrap UCL	9.438
Kolmogorov-Smirnov Test Statistic	0.511	95% Percentile Bootstrap UCL	9.567
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	9.447
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.68
		97.5% Chebyshev(Mean, Sd) UCL	13.01
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.63
95% Approximate Gamma UCL	12.62		
95% Adjusted Gamma UCL	12.99		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 11.68

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 10

Raw Statistics

	Log-transformed Statistics	
Minimum	5.2 Minimum of Log Data	1.649
Maximum	70.86 Maximum of Log Data	4.261
Mean	58.79 Mean of log Data	3.958
Median	65 SD of log Data	0.652
SD	16.79	
Coefficient of Variation	0.286	
Skewness	-2.873	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.485 Shapiro Wilk Test Statistic	0.399
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.8	95% H-UCL	86.93
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	104.5
95% Adjusted-CLT UCL (Chen-1995)	62.31	97.5% Chebyshev (MVUE) UCL	121.9
95% Modified-t UCL (Johnson-1978)	64.45	99% Chebyshev (MVUE) UCL	156.3

Gamma Distribution Test

k star (bias corrected)	3.918	Data Distribution	
Theta Star	15.01	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.79		
MLE of Standard Deviation	29.7		
nu star	180.2		
Approximate Chi Square Value (.05)	150.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	64.55
Adjusted Chi Square Value	148.2	95% Jackknife UCL	64.8
		95% Standard Bootstrap UCL	64.35
Anderson-Darling Test Statistic	6.223	95% Bootstrap-t UCL	62.92
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	62.93
Kolmogorov-Smirnov Test Statistic	0.402	95% Percentile Bootstrap UCL	64.08
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	63
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.05
		97.5% Chebyshev(Mean, Sd) UCL	80.65
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	93.62
95% Approximate Gamma UCL	70.56		
95% Adjusted Gamma UCL	71.5		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 74.05

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.35	Minimum of Log Data	-1.05
Maximum	5	Maximum of Log Data	1.609
Mean	4.412	Mean of log Data	1.299
Median	5	SD of log Data	0.83
SD	1.554		
Coefficient of Variation	0.352		
Skewness	-2.359		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.406	Shapiro Wilk Test Statistic	0.414
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.968	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.784
95% Adjusted-CLT UCL (Chen-1995)	4.774	95% Chebyshev (MVUE) UCL	9.265
95% Modified-t UCL (Johnson-1978)	4.942	97.5% Chebyshev (MVUE) UCL	11.08
		99% Chebyshev (MVUE) UCL	14.64

Gamma Distribution Test

k star (bias corrected)	2.507	Data Distribution	
Theta Star	1.759	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.412		
MLE of Standard Deviation	2.786		
nu star	115.3		
Approximate Chi Square Value (.05)	91.55	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	4.945
Adjusted Chi Square Value	90.01	95% Jackknife UCL	4.968
		95% Standard Bootstrap UCL	4.905
Anderson-Darling Test Statistic	7.098	95% Bootstrap-t UCL	4.863
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	4.82
Kolmogorov-Smirnov Test Statistic	0.53	95% Percentile Bootstrap UCL	4.799
Kolmogorov-Smirnov 5% Critical Value	0.183	95% BCA Bootstrap UCL	4.799
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.825
		97.5% Chebyshev(Mean, Sd) UCL	6.436
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.637
95% Approximate Gamma UCL	5.558		
95% Adjusted Gamma UCL	5.653		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.825

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 6

Raw Statistics

Minimum	0.033	Log-transformed Statistics	
Maximum	12.38	Minimum of Log Data	-3.411
Mean	8.835	Maximum of Log Data	2.516
Median		Mean of log Data	1.727
SD	3.444	10 SD of log Data	1.614
Coefficient of Variation	0.39		
Skewness	-2.243		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.478	Shapiro Wilk Test Statistic	0.429
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.07	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	67.2
95% Adjusted-CLT UCL (Chen-1995)	9.658	95% Chebyshev (MVUE) UCL	51.89
95% Modified-t UCL (Johnson-1978)	10.01	97.5% Chebyshev (MVUE) UCL	66.36
		99% Chebyshev (MVUE) UCL	94.79

Gamma Distribution Test

k star (bias corrected)	1.114	Data Distribution	
Theta Star	7.934	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.835		
MLE of Standard Deviation	8.373		
nu star	51.22	Nonparametric Statistics	
Approximate Chi Square Value (.05)	35.79	95% CLT UCL	10.02
Adjusted Level of Significance	0.0389	95% Jackknife UCL	10.07
Adjusted Chi Square Value	34.85	95% Standard Bootstrap UCL	9.971
		95% Bootstrap-t UCL	9.839
Anderson-Darling Test Statistic	6.947	95% Hall's Bootstrap UCL	9.719
Anderson-Darling 5% Critical Value	0.765	95% Percentile Bootstrap UCL	9.798
Kolmogorov-Smirnov Test Statistic	0.54	95% BCA Bootstrap UCL	9.775
Kolmogorov-Smirnov 5% Critical Value	0.186	95% Chebyshev(Mean, Sd) UCL	11.97
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	13.32
		99% Chebyshev(Mean, Sd) UCL	15.98
Assuming Gamma Distribution			
95% Approximate Gamma UCL	12.65		
95% Adjusted Gamma UCL	12.99		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.97

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 4

Raw Statistics

		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	0.69	Maximum of Log Data	-0.371
Mean	0.45	Mean of log Data	-0.829
Median	0.45	SD of log Data	0.297
SD	0.0891		
Coefficient of Variation	0.198		
Skewness	-1.506		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.472	Shapiro Wilk Test Statistic	0.374
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.482	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.512
95% Adjusted-CLT UCL (Chen-1995)	0.474	95% Chebyshev (MVUE) UCL	0.58
95% Modified-t UCL (Johnson-1978)	0.481	97.5% Chebyshev (MVUE) UCL	0.634
		99% Chebyshev (MVUE) UCL	0.74

Gamma Distribution Test

k star (bias corrected)	14.22	Data Distribution	
Theta Star	0.0317	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.45		
MLE of Standard Deviation	0.119		
nu star	654		
Approximate Chi Square Value (.05)	595.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.481
Adjusted Chi Square Value	591.7	95% Jackknife UCL	0.482
		95% Standard Bootstrap UCL	0.48
Anderson-Darling Test Statistic	6.271	95% Bootstrap-t UCL	0.477
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	0.478
Kolmogorov-Smirnov Test Statistic	0.489	95% Percentile Bootstrap UCL	0.479
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	0.472
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.531
		97.5% Chebyshev(Mean, Sd) UCL	0.566
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.635
95% Approximate Gamma UCL	0.494		
95% Adjusted Gamma UCL	0.497		

Potential UCL to Use Use 95% Student's-t UCL 0.482
 or 95% Modified-t UCL 0.481

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0117	Minimum of Log Data	-4.448
Maximum	0.316	Maximum of Log Data	-1.152
Mean	0.164	Mean of log Data	-1.895
Median	0.164	SD of log Data	0.573
SD	0.0459		
Coefficient of Variation	0.28		
Skewness	-4.03E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.413	Shapiro Wilk Test Statistic	0.31
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.18	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.227
95% Adjusted-CLT UCL (Chen-1995)	0.18	95% Chebyshev (MVUE) UCL	0.272
95% Modified-t UCL (Johnson-1978)	0.18	97.5% Chebyshev (MVUE) UCL	0.313
		99% Chebyshev (MVUE) UCL	0.395

Gamma Distribution Test

k star (bias corrected)	5.214	Data Distribution	
Theta Star	0.0314	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.164		
MLE of Standard Deviation	0.0717		
nu star	239.9		
Approximate Chi Square Value (.05)	205	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.18
Adjusted Chi Square Value	202.7	95% Jackknife UCL	0.18

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	7.094	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.746	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.511	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.182	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.205
		97.5% Chebyshev(Mean, Sd) UCL	0.224
		99% Chebyshev(Mean, Sd) UCL	0.259
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.192		
95% Adjusted Gamma UCL	0.194		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.205

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.054	Minimum of Log Data	-2.919
Maximum	0.132	Maximum of Log Data	-2.025
Mean	0.093	Mean of log Data	-2.384
Median	0.093	SD of log Data	0.138
SD	0.0118		
Coefficient of Variation	0.126		
Skewness	4.77E-15		

Warning: There are only 3 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.413	Shapiro Wilk Test Statistic	0.396
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0972	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.098
95% Adjusted-CLT UCL (Chen-1995)	0.097	95% Chebyshev (MVUE) UCL	0.105
95% Modified-t UCL (Johnson-1978)	0.0972	97.5% Chebyshev (MVUE) UCL	0.11
		99% Chebyshev (MVUE) UCL	0.12

Gamma Distribution Test

k star (bias corrected)	51.88	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.00179		
MLE of Mean	0.093		
MLE of Standard Deviation	0.0129		
nu star	2386		
Approximate Chi Square Value (.05)	2274	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.097
Adjusted Chi Square Value	2266	95% Jackknife UCL	0.0972

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	6.831	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.474	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.181	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.104
		97.5% Chebyshev(Mean, Sd) UCL	0.108
		99% Chebyshev(Mean, Sd) UCL	0.117
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.0976		
95% Adjusted Gamma UCL	0.0979		

Potential UCL to Use

		Use 95% Student's-t UCL	0.0972
		or 95% Modified-t UCL	0.0972

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.85	Minimum of Log Data	-0.163
Maximum	2.48	Maximum of Log Data	0.908
Mean	1.665	Mean of log Data	0.498
Median	1.665	SD of log Data	0.166
SD	0.246		
Coefficient of Variation	0.148		
Skewness	8.20E-15		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.413	Shapiro Wilk Test Statistic	0.389
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.753	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.775
95% Adjusted-CLT UCL (Chen-1995)	1.749	95% Chebyshev (MVUE) UCL	1.92
95% Modified-t UCL (Johnson-1978)	1.753	97.5% Chebyshev (MVUE) UCL	2.03
		99% Chebyshev (MVUE) UCL	2.245

Gamma Distribution Test

k star (bias corrected)	36.68	Data Distribution	
Theta Star	0.0454	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.665		
MLE of Standard Deviation	0.275		
nu star	1687		
Approximate Chi Square Value (.05)	1593	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	1.749
Adjusted Chi Square Value	1586	95% Jackknife UCL	1.753
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	6.842	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.477	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.888
		97.5% Chebyshev(Mean, Sd) UCL	1.985
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.175
95% Approximate Gamma UCL	1.764		
95% Adjusted Gamma UCL	1.771		

Potential UCL to Use	Use 95% Student's-t UCL	1.753
	or 95% Modified-t UCL	1.753

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 195-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Chromium

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 4

Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	35.84	Minimum of Log Data	3.579
Maximum		85 Maximum of Log Data	4.443
Mean	74.6	Mean of log Data	4.277
Median		85 SD of log Data	0.299
SD	17.97		
Coefficient of Variation	0.241		
Skewness	-1.522		

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Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.66	Shapiro Wilk Test Statistic	0.647
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	85.01	95% H-UCL	91.73
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	106.1
95% Adjusted-CLT UCL (Chen-1995)	81.02	97.5% Chebyshev (MVUE) UCL	119.6
95% Modified-t UCL (Johnson-1978)	84.56	99% Chebyshev (MVUE) UCL	146

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	10.26	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.273		
MLE of Mean	74.6		
MLE of Standard Deviation	23.29		
nu star	205.1		

Approximate Chi Square Value (.05)

	Approximate Chi Square Value (.05)	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	83.94
Adjusted Chi Square Value	167.9	95% Jackknife UCL	85.01

Anderson-Darling Test Statistic

	Anderson-Darling Test Statistic	95% Standard Bootstrap UCL	
Anderson-Darling 5% Critical Value	0.725	95% Bootstrap-t UCL	83.01
Kolmogorov-Smirnov Test Statistic	0.424	95% Hall's Bootstrap UCL	81.51
Kolmogorov-Smirnov 5% Critical Value	0.266	95% Percentile Bootstrap UCL	81.69
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	80.08
		95% Chebyshev(Mean, Sd) UCL	99.36
		97.5% Chebyshev(Mean, Sd) UCL	110.1
		99% Chebyshev(Mean, Sd) UCL	131.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	88.46
95% Adjusted Gamma UCL	91.16

Potential UCL to Use

Use 95% Student's-t UCL	85.01
or 95% Modified-t UCL	84.56

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	11.2	Minimum of Log Data	2.416
Maximum	70.2	Maximum of Log Data	4.251
Mean	58.9	Mean of log Data	3.985
Median	65	SD of log Data	0.556
SD	17.33		
Coefficient of Variation	0.294		
Skewness	-2.823		

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Those methods will return a 'N/A' value on your output display!

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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.532	Shapiro Wilk Test Statistic	0.453
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	68.95	95% H-UCL	96.21
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	110.1
95% Adjusted-CLT UCL (Chen-1995)	62.69	97.5% Chebyshev (MVUE) UCL	131
95% Modified-t UCL (Johnson-1978)	68.13	99% Chebyshev (MVUE) UCL	172.1

Gamma Distribution Test

k star (bias corrected)	4.036	Data Distribution	
Theta Star	14.6	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.9		
MLE of Standard Deviation	29.32		
nu star	80.72		
Approximate Chi Square Value (.05)	61.01	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	67.92
Adjusted Chi Square Value	58.05	95% Jackknife UCL	68.95
		95% Standard Bootstrap UCL	67.42
Anderson-Darling Test Statistic	2.585	95% Bootstrap-t UCL	65.66
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	64.29
Kolmogorov-Smirnov Test Statistic	0.447	95% Percentile Bootstrap UCL	65.84
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	64.28
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	82.79
		97.5% Chebyshev(Mean, Sd) UCL	93.13
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	113.4
95% Approximate Gamma UCL	77.92		
95% Adjusted Gamma UCL	81.91		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 82.79
Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	0.034 Minimum of Log Data	-3.381
Maximum	10 Maximum of Log Data	2.303
Mean	8.94 Mean of log Data	1.728
Median	10 SD of log Data	1.795
SD	3.136	
Coefficient of Variation	0.351	
Skewness	-3.139	

Warning: There are only 3 Distinct Values in this data

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Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.397 Shapiro Wilk Test Statistic	0.372
Shapiro Wilk Critical Value	0.842 Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.76 95% H-UCL	530.1
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	74.03
95% Adjusted-CLT UCL (Chen-1995)	9.52 97.5% Chebyshev (MVUE) UCL	97.12
95% Modified-t UCL (Johnson-1978)	10.59 99% Chebyshev (MVUE) UCL	142.5

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.921 Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.712	
MLE of Mean	8.94	
MLE of Standard Deviation	9.318	
nu star	18.41	
Approximate Chi Square Value (.05)	9.689 Nonparametric Statistics	
Adjusted Level of Significance	0.0267 95% CLT UCL	10.57
Adjusted Chi Square Value	8.61 95% Jackknife UCL	10.76
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.457 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.539 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.273 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	13.26
	97.5% Chebyshev(Mean, Sd) UCL	15.13
	99% Chebyshev(Mean, Sd) UCL	18.81
Assuming Gamma Distribution		
95% Approximate Gamma UCL	16.99	
95% Adjusted Gamma UCL	19.12	

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 18.81

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	7
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Raw Statistics

Minimum	34.78
Maximum	85
Mean	61.63
Median	45.2
SD	22.57
Coefficient of Variation	0.366
Skewness	0.15

Log-transformed Statistics

Minimum of Log Data	3.549
Maximum of Log Data	4.443
Mean of log Data	4.058
SD of log Data	0.376

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.73	Shapiro Wilk Test Statistic	0.764
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.96
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	73.15
95% Modified-t UCL (Johnson-1978)	74.02

Assuming Lognormal Distribution

95% H-UCL	78.99
95% Chebyshev (MVUE) UCL	92.49
97.5% Chebyshev (MVUE) UCL	105.8
99% Chebyshev (MVUE) UCL	132

Gamma Distribution Test

k star (bias corrected)	5.916
Theta Star	10.42
MLE of Mean	61.63
MLE of Standard Deviation	25.34
nu star	130.2

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.028
Adjusted Chi Square Value	101.1

Nonparametric Statistics

95% CLT UCL	72.82
95% Jackknife UCL	73.96
95% Standard Bootstrap UCL	72.13
95% Bootstrap-t UCL	75.02
95% Hall's Bootstrap UCL	70.29
95% Percentile Bootstrap UCL	72.69
95% BCA Bootstrap UCL	73.04
95% Chebyshev(Mean, Sd) UCL	91.29
97.5% Chebyshev(Mean, Sd) UCL	104.1
99% Chebyshev(Mean, Sd) UCL	129.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	76.54
95% Adjusted Gamma UCL	79.35

Potential UCL to Use

Use 95% Student's-t UCL	73.96
or 95% Modified-t UCL	74.02

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	0.054	Minimum of Log Data	-2.919
Maximum	10	Maximum of Log Data	2.303
Mean	9.049	Mean of log Data	1.823
Median	10	SD of log Data	1.573
SD	2.987		
Coefficient of Variation	0.33		
Skewness	-3.3		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.37	Shapiro Wilk Test Statistic	0.35
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.68	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	171.5
95% Adjusted-CLT UCL (Chen-1995)	9.572	95% Chebyshev (MVUE) UCL	56.3
95% Modified-t UCL (Johnson-1978)	10.53	97.5% Chebyshev (MVUE) UCL	73.1
		99% Chebyshev (MVUE) UCL	106.1

Gamma Distribution Test

k star (bias corrected)	1.124	Data Distribution	
Theta Star	8.053	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.049		
MLE of Standard Deviation	8.536		
nu star	24.72		
Approximate Chi Square Value (.05)	14.4	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	10.53
Adjusted Chi Square Value	13.13	95% Jackknife UCL	10.68
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.841	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.54	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.26	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.97
		97.5% Chebyshev(Mean, Sd) UCL	14.67
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.01
95% Approximate Gamma UCL	15.54		
95% Adjusted Gamma UCL	17.04		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.01

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

11 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	7
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Raw Statistics

Minimum	12.5	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.526
Mean	58.09	Maximum of Log Data	4.443
Median	50.3	Mean of log Data	3.921
SD	27.52	SD of log Data	0.615
Coefficient of Variation	0.474		
Skewness	-0.238		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.828
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.13	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	95.99
95% Adjusted-CLT UCL (Chen-1995)	71.1	95% Chebyshev (MVUE) UCL	109.5
95% Modified-t UCL (Johnson-1978)	73.03	97.5% Chebyshev (MVUE) UCL	131
		99% Chebyshev (MVUE) UCL	173.3

Gamma Distribution Test

k star (bias corrected)	2.755	Data Distribution	
Theta Star	21.09	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.09		
MLE of Standard Deviation	35		
nu star	60.6		
Approximate Chi Square Value (.05)	43.7	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	71.74
Adjusted Chi Square Value	41.37	95% Jackknife UCL	73.13
		95% Standard Bootstrap UCL	71.01
Anderson-Darling Test Statistic	0.759	95% Bootstrap-t UCL	72.87
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	70.4
Kolmogorov-Smirnov Test Statistic	0.284	95% Percentile Bootstrap UCL	71.08
Kolmogorov-Smirnov 5% Critical Value	0.257	95% BCA Bootstrap UCL	70.56
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.25
		97.5% Chebyshev(Mean, Sd) UCL	109.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	140.6
95% Approximate Gamma UCL	80.56		
95% Adjusted Gamma UCL	85.1		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	94.25
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 11 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	12.8	Minimum of Log Data	2.549
Maximum	65	Maximum of Log Data	4.174
Mean	59.09	Mean of log Data	4.007
Median	65	SD of log Data	0.488
SD	15.83		
Coefficient of Variation	0.268		
Skewness	-3.009		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.448	Shapiro Wilk Test Statistic	0.406
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.74	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	86.39
95% Adjusted-CLT UCL (Chen-1995)	62.31	95% Chebyshev (MVUE) UCL	101.2
95% Modified-t UCL (Johnson-1978)	67.01	97.5% Chebyshev (MVUE) UCL	118.5
		99% Chebyshev (MVUE) UCL	152.5

Gamma Distribution Test

k star (bias corrected)	5.204	Data Distribution	
Theta Star	11.35	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	59.09		
MLE of Standard Deviation	25.9		
nu star	114.5		
Approximate Chi Square Value (.05)	90.79	Nonparametric Statistics	
Adjusted Level of Significance	0.028	95% CLT UCL	66.94
Adjusted Chi Square Value	87.35	95% Jackknife UCL	67.74
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.125	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	79.89
		97.5% Chebyshev(Mean, Sd) UCL	88.89
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	106.6
95% Approximate Gamma UCL	74.51		
95% Adjusted Gamma UCL	77.44		

Potential UCL to Use Use 95% Student's-t UCL 67.74
 or 95% Modified-t UCL 67.01

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

11 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	9
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Raw Statistics

		Log-transformed Statistics	
Minimum	31.26	Minimum of Log Data	3.442
Maximum	85	Maximum of Log Data	4.443
Mean	61.57	Mean of log Data	4.057
Median	61.57	SD of log Data	0.376
SD	21.57		
Coefficient of Variation	0.35		
Skewness	-0.0252		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Test Statistic	0.858
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.38	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	75.48
95% Adjusted-CLT UCL (Chen-1995)	70.69	95% Chebyshev (MVUE) UCL	88.37
95% Modified-t UCL (Johnson-1978)	71.37	97.5% Chebyshev (MVUE) UCL	99.88
		99% Chebyshev (MVUE) UCL	122.5

Gamma Distribution Test

k star (bias corrected)	6.523	Data Distribution	
Theta Star	9.44	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.57		
MLE of Standard Deviation	24.11		
nu star	195.7		
Approximate Chi Square Value (.05)	164.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	70.73
Adjusted Chi Square Value	160.8	95% Jackknife UCL	71.38
		95% Standard Bootstrap UCL	70.44
Anderson-Darling Test Statistic	0.909	95% Bootstrap-t UCL	71.79
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	70.25
Kolmogorov-Smirnov Test Statistic	0.261	95% Percentile Bootstrap UCL	70.62
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	70.39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	85.85
		97.5% Chebyshev(Mean, Sd) UCL	96.35
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117
95% Approximate Gamma UCL	73.32		
95% Adjusted Gamma UCL	74.94		

Potential UCL to Use

Use 95% Student's-t UCL	71.38
or 95% Modified-t UCL	71.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
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Raw Statistics

Minimum	10	Log-transformed Statistics	
Maximum	65	Minimum of Log Data	2.303
Mean	60.56	Maximum of Log Data	4.174
Median	65	Mean of log Data	4.037
SD	14.08	SD of log Data	0.481
Coefficient of Variation	0.233		
Skewness	-3.786		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.355	Shapiro Wilk Test Statistic	0.317
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.96	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	82.75
95% Adjusted-CLT UCL (Chen-1995)	62.74	95% Chebyshev (MVUE) UCL	98.15
95% Modified-t UCL (Johnson-1978)	66.37	97.5% Chebyshev (MVUE) UCL	113.3
		99% Chebyshev (MVUE) UCL	143.1

Gamma Distribution Test

k star (bias corrected)	6.206	Data Distribution	
Theta Star	9.758	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	60.56		
MLE of Standard Deviation	24.31		
nu star	186.2		
Approximate Chi Square Value (.05)	155.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	66.54
Adjusted Chi Square Value	152.2	95% Jackknife UCL	66.96
		95% Standard Bootstrap UCL	66.41
Anderson-Darling Test Statistic	4.73	95% Bootstrap-t UCL	64.87
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	64.04
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	64.52
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	64.23
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	76.41
		97.5% Chebyshev(Mean, Sd) UCL	83.27
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	96.74
95% Approximate Gamma UCL	72.45		
95% Adjusted Gamma UCL	74.09		

Potential UCL to Use	Use 95% Student's-t UCL	66.96
	or 95% Modified-t UCL	66.37

Recommended UCL exceeds the maximum observation
 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-05.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	8
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Raw Statistics

Minimum	32.28	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.474
Mean	54.48	Maximum of Log Data	4.443
Median	43.52	Mean of log Data	3.927
SD	22.19	SD of log Data	0.391
Coefficient of Variation	0.407		
Skewness	0.701		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.34	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	71.83
95% Adjusted-CLT UCL (Chen-1995)	67.68	95% Chebyshev (MVUE) UCL	83.97
95% Modified-t UCL (Johnson-1978)	67.6	97.5% Chebyshev (MVUE) UCL	96.79
		99% Chebyshev (MVUE) UCL	122

Gamma Distribution Test

k star (bias corrected)	5.121	Data Distribution	
Theta Star	10.64	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	54.48		
MLE of Standard Deviation	24.07		
nu star	102.4		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0267	Nonparametric Statistics	
Adjusted Chi Square Value	76.63	95% CLT UCL	66.02
		95% Jackknife UCL	67.34
		95% Standard Bootstrap UCL	65.53

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.781	95% Bootstrap-t UCL	69.19
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	63.44
Kolmogorov-Smirnov Test Statistic	0.259	95% Percentile Bootstrap UCL	65.75
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	67.35
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	85.06
		97.5% Chebyshev(Mean, Sd) UCL	98.29
		99% Chebyshev(Mean, Sd) UCL	124.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	69.68
95% Adjusted Gamma UCL	72.8

Potential UCL to Use

	Use 95% Approximate Gamma UCL	69.68
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	12.4	Minimum of Log Data	2.518
Maximum	81.1	Maximum of Log Data	4.396
Mean	61.35	Mean of log Data	4.031
Median	65	SD of log Data	0.536
SD	17.93		
Coefficient of Variation	0.292		
Skewness	-2.632		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.537	Shapiro Wilk Test Statistic	0.449
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.74	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	97.57
95% Adjusted-CLT UCL (Chen-1995)	65.63	95% Chebyshev (MVUE) UCL	112.2
95% Modified-t UCL (Johnson-1978)	70.96	97.5% Chebyshev (MVUE) UCL	133.1
		99% Chebyshev (MVUE) UCL	174.1

Gamma Distribution Test

k star (bias corrected)	4.262	Data Distribution	
Theta Star	14.4	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.35		
MLE of Standard Deviation	29.72		
nu star	85.23		
Approximate Chi Square Value (.05)	64.95	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	70.68
Adjusted Chi Square Value	61.88	95% Jackknife UCL	71.74
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.714	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.51	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.06
		97.5% Chebyshev(Mean, Sd) UCL	96.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	117.8
95% Approximate Gamma UCL	80.51		
95% Adjusted Gamma UCL	84.5		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 86.06

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

10 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-06.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	30.92	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.431
Mean	52.65	Maximum of Log Data	4.443
Median	41.8	Mean of log Data	3.872
SD	24.28	SD of log Data	0.437
Coefficient of Variation	0.461		
Skewness	0.703		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.729	Shapiro Wilk Test Statistic	0.778
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	65.23	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.39
95% Adjusted-CLT UCL (Chen-1995)	65.69	95% Chebyshev (MVUE) UCL	81.75
95% Modified-t UCL (Johnson-1978)	65.47	97.5% Chebyshev (MVUE) UCL	94.45
		99% Chebyshev (MVUE) UCL	119.4

Gamma Distribution Test

k star (bias corrected)	4.286	Data Distribution	
Theta Star	12.28	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	52.65		
MLE of Standard Deviation	25.43		
nu star	102.9		
Approximate Chi Square Value (.05)	80.46	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	64.18
Adjusted Chi Square Value	77.44	95% Jackknife UCL	65.23
		95% Standard Bootstrap UCL	63.76
Anderson-Darling Test Statistic	1.328	95% Bootstrap-t UCL	70.57
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	61.27
Kolmogorov-Smirnov Test Statistic	0.263	95% Percentile Bootstrap UCL	64.72
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	65.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	83.2
		97.5% Chebyshev(Mean, Sd) UCL	96.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	122.4
95% Approximate Gamma UCL	67.3		
95% Adjusted Gamma UCL	69.93		

Potential UCL to Use

Use 95% Student's-t UCL	65.23
or 95% Modified-t UCL	65.47

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	11.3	Minimum of Log Data 2.425
Maximum	98.09	Maximum of Log Data 4.586
Mean	63.28	Mean of log Data 4.063
Median	65	SD of log Data 0.529
SD	18.93	
Coefficient of Variation	0.299	
Skewness	-1.58	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.573	Shapiro Wilk Test Statistic 0.454
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	73.1	95% H-UCL 94.67
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 111.1
95% Adjusted-CLT UCL (Chen-1995)	69.61	97.5% Chebyshev (MVUE) UCL 130.7
95% Modified-t UCL (Johnson-1978)	72.68	99% Chebyshev (MVUE) UCL 169

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	4.603	Data do not follow a Discernable Distribution (0.05)
Theta Star	13.75	
MLE of Mean	63.28	
MLE of Standard Deviation	29.5	
nu star	110.5	
Approximate Chi Square Value (.05)	87.21	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 72.27
Adjusted Chi Square Value	84.06	95% Jackknife UCL 73.1
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	3.109	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.497	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 87.11
		97.5% Chebyshev(Mean, Sd) UCL 97.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 117.7
95% Approximate Gamma UCL	80.16	
95% Adjusted Gamma UCL	83.17	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 87.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-07.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	34.18	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.532
Mean	57.89	Maximum of Log Data	4.443
Median	45.56	Mean of log Data	3.976
SD	24.27	SD of log Data	0.423
Coefficient of Variation	0.419		
Skewness	0.301		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.726	Shapiro Wilk Test Statistic	0.756
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.47	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	75.77
95% Adjusted-CLT UCL (Chen-1995)	70.06	95% Chebyshev (MVUE) UCL	89.21
95% Modified-t UCL (Johnson-1978)	70.57	97.5% Chebyshev (MVUE) UCL	102.8
		99% Chebyshev (MVUE) UCL	129.4

Gamma Distribution Test

k star (bias corrected)	4.743	Data Distribution	
Theta Star	12.21	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	57.89		
MLE of Standard Deviation	26.58		
nu star	113.8		

Approximate Chi Square Value (.05)	90.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	69.41
Adjusted Chi Square Value	86.99	95% Jackknife UCL	70.47
		95% Standard Bootstrap UCL	68.78
Anderson-Darling Test Statistic	1.429	95% Bootstrap-t UCL	72.21
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	67.77
Kolmogorov-Smirnov Test Statistic	0.293	95% Percentile Bootstrap UCL	68.8
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	69.69
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	88.43
		97.5% Chebyshev(Mean, Sd) UCL	101.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	127.6
95% Approximate Gamma UCL	73.06		
95% Adjusted Gamma UCL	75.75		

Potential UCL to Use	Use 95% Student's-t UCL	70.47
	or 95% Modified-t UCL	70.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.034	Minimum of Log Data -3.381
Maximum	10	Maximum of Log Data 2.303
Mean	9.008	Mean of log Data 1.811
Median	10	SD of log Data 1.636
SD	2.881	
Coefficient of Variation	0.32	
Skewness	-3.26	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.408	Shapiro Wilk Test Statistic 0.344
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	10.5	95% H-UCL 183.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 61.73
95% Adjusted-CLT UCL (Chen-1995)	9.54	97.5% Chebyshev (MVUE) UCL 80.24
95% Modified-t UCL (Johnson-1978)	10.37	99% Chebyshev (MVUE) UCL 116.6

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.132	Data do not follow a Discernable Distribution (0.05)
Theta Star	7.957	
MLE of Mean	9.008	
MLE of Standard Deviation	8.466	
nu star	27.17	
Approximate Chi Square Value (.05)	16.28	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 10.38
Adjusted Chi Square Value	15.01	95% Jackknife UCL 10.5
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	4.052	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.491	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 12.63
		97.5% Chebyshev(Mean, Sd) UCL 14.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 17.28
95% Approximate Gamma UCL	15.03	
95% Adjusted Gamma UCL	16.31	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 17.28

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 195-08.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 4

Raw Statistics

	Log-transformed Statistics	
Minimum	8.01 Minimum of Log Data	2.081
Maximum	13.8 Maximum of Log Data	2.625
Mean	10.91 Mean of log Data	2.383
Median	11 SD of log Data	0.12
SD	1.263	
Coefficient of Variation	0.116	
Skewness	-0.035	

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.691 Shapiro Wilk Test Statistic	0.682
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.56	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.64
95% Adjusted-CLT UCL (Chen-1995)	11.5	95% Chebyshev (MVUE) UCL	12.55
95% Modified-t UCL (Johnson-1978)	11.56	97.5% Chebyshev (MVUE) UCL	13.26
		99% Chebyshev (MVUE) UCL	14.66

Gamma Distribution Test

k star (bias corrected)	58.93	Data Distribution	
Theta Star	0.185	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.91		
MLE of Standard Deviation	1.421		
nu star	1414		
Approximate Chi Square Value (.05)	1328	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.51
Adjusted Chi Square Value	1315	95% Jackknife UCL	11.56
		95% Standard Bootstrap UCL	11.5
Anderson-Darling Test Statistic	2.1	95% Bootstrap-t UCL	11.52
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	11.7
Kolmogorov-Smirnov Test Statistic	0.379	95% Percentile Bootstrap UCL	11.47
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.45
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.5
		97.5% Chebyshev(Mean, Sd) UCL	13.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.53
95% Approximate Gamma UCL	11.61		
95% Adjusted Gamma UCL	11.73		

Potential UCL to Use

	Use 95% Student's-t UCL	11.56
	or 95% Modified-t UCL	11.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	17.7	Minimum of Log Data	2.874
Maximum	85	Maximum of Log Data	4.443
Mean	62.15	Mean of log Data	4.039
Median	66.77	SD of log Data	0.487
SD	23.83		
Coefficient of Variation	0.383		
Skewness	-0.5		

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.854	Shapiro Wilk Test Statistic	0.821
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	74.5	95% H-UCL	87.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	102.8
95% Adjusted-CLT UCL (Chen-1995)	72.4	97.5% Chebyshev (MVUE) UCL	119.9
95% Modified-t UCL (Johnson-1978)	74.34	99% Chebyshev (MVUE) UCL	153.5

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	4.295	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	14.47		
MLE of Mean	62.15		
MLE of Standard Deviation	29.99		
nu star	103.1		
Approximate Chi Square Value (.05)	80.65	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	73.46
Adjusted Chi Square Value	77.62	95% Jackknife UCL	74.5
		95% Standard Bootstrap UCL	72.94
Anderson-Darling Test Statistic	0.786	95% Bootstrap-t UCL	73.36
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	72.11
Kolmogorov-Smirnov Test Statistic	0.238	95% Percentile Bootstrap UCL	72.74
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	72.24
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	92.13
		97.5% Chebyshev(Mean, Sd) UCL	105.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	130.6
95% Approximate Gamma UCL	79.43		
95% Adjusted Gamma UCL	82.53		

Potential UCL to Use	Use 95% Approximate Gamma UCL	79.43
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations

12 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	18.8 Minimum of Log Data	2.934
Maximum	81.74 Maximum of Log Data	4.404
Mean	62.55 Mean of log Data	4.09
Median	65 SD of log Data	0.37
SD	14.59	
Coefficient of Variation	0.233	
Skewness	-2.685	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.507 Shapiro Wilk Test Statistic	0.43
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	70.11 95% H-UCL	79.93
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	93.61
95% Adjusted-CLT UCL (Chen-1995)	65.98 97.5% Chebyshev (MVUE) UCL	106.6
95% Modified-t UCL (Johnson-1978)	69.57 99% Chebyshev (MVUE) UCL	132.1

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	8.37 Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.473	
MLE of Mean	62.55	
MLE of Standard Deviation	21.62	
nu star	200.9	
Approximate Chi Square Value (.05)	169.1 Nonparametric Statistics	
Adjusted Level of Significance	0.029 95% CLT UCL	69.47
Adjusted Chi Square Value	164.6 95% Jackknife UCL	70.11
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.285 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.507 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	80.91
	97.5% Chebyshev(Mean, Sd) UCL	88.85
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	104.5
95% Approximate Gamma UCL	74.31	
95% Adjusted Gamma UCL	76.31	

Potential UCL to Use	Use 95% Student's-t UCL	70.11
	or 95% Modified-t UCL	69.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-10.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	6.6	Minimum of Log Data	1.887
Maximum	85	Maximum of Log Data	4.443
Mean	55.42	Mean of log Data	3.837
Median	42.92	SD of log Data	0.731
SD	27.74		
Coefficient of Variation	0.501		
Skewness	-0.0885		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.815	Shapiro Wilk Test Statistic	0.753
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	69.8	95% H-UCL	104.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	115.7
95% Adjusted-CLT UCL (Chen-1995)	68.37	97.5% Chebyshev (MVUE) UCL	140.2
95% Modified-t UCL (Johnson-1978)	69.77	99% Chebyshev (MVUE) UCL	188.4

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.28	Data do not follow a Discernable Distribution (0.05)	
Theta Star	24.3		
MLE of Mean	55.42		
MLE of Standard Deviation	36.7		
nu star	54.72		
Approximate Chi Square Value (.05)	38.72	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	68.59
Adjusted Chi Square Value	36.68	95% Jackknife UCL	69.8
		95% Standard Bootstrap UCL	68.15
Anderson-Darling Test Statistic	0.972	95% Bootstrap-t UCL	69.57
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	67.15
Kolmogorov-Smirnov Test Statistic	0.253	95% Percentile Bootstrap UCL	68.61
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	67.41
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	90.33
		97.5% Chebyshev(Mean, Sd) UCL	105.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	135.1
95% Approximate Gamma UCL	78.31		
95% Adjusted Gamma UCL	82.68		

Potential UCL to Use

		Use 95% Chebyshev (Mean, Sd) UCL	90.33
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Recommended UCL exceeds the maximum observation
 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	5.3 Minimum of Log Data	1.668
Maximum	74.02 Maximum of Log Data	4.304
Mean	60.78 Mean of log Data	3.976
Median	65 SD of log Data	0.728
SD	17.66	
Coefficient of Variation	0.291	
Skewness	-3.32	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.413 Shapiro Wilk Test Statistic	0.357
Shapiro Wilk Critical Value	0.859 Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.93	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	119.2
95% Adjusted-CLT UCL (Chen-1995)	63.94	95% Chebyshev (MVUE) UCL	132.5
95% Modified-t UCL (Johnson-1978)	69.12	97.5% Chebyshev (MVUE) UCL	160.5
		99% Chebyshev (MVUE) UCL	215.5

Gamma Distribution Test

k star (bias corrected)	3.04	Data Distribution	
Theta Star	19.99	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	60.78		
MLE of Standard Deviation	34.86		
nu star	72.96		
Approximate Chi Square Value (.05)	54.29	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	69.16
Adjusted Chi Square Value	51.84	95% Jackknife UCL	69.93

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.827	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.736	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.536	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	83
		97.5% Chebyshev(Mean, Sd) UCL	92.62
		99% Chebyshev(Mean, Sd) UCL	111.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	81.68		
95% Adjusted Gamma UCL	85.54		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	83
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics	Log-transformed Statistics	
Minimum	0.051	Minimum of Log Data -2.976
Maximum	13.11	Maximum of Log Data 2.573
Mean	9.43	Mean of log Data 1.885
Median	10	SD of log Data 1.533
SD	3.086	
Coefficient of Variation	0.327	
Skewness	-2.871	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.488	Shapiro Wilk Test Statistic 0.357
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	11.03	95% H-UCL 133.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 55.84
95% Adjusted-CLT UCL (Chen-1995)	10.11	97.5% Chebyshev (MVUE) UCL 72.24
95% Modified-t UCL (Johnson-1978)	10.91	99% Chebyshev (MVUE) UCL 104.5

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	1.21	Data do not follow a Discernable Distribution (0.05)
Theta Star	7.791	
MLE of Mean	9.43	
MLE of Standard Deviation	8.572	
nu star	29.05	
Approximate Chi Square Value (.05)	17.75	Nonparametric Statistics
Adjusted Level of Significance	0.029	95% CLT UCL 10.9
Adjusted Chi Square Value	16.41	95% Jackknife UCL 11.03
		95% Standard Bootstrap UCL N/A
Anderson-Darling Test Statistic	3.907	95% Bootstrap-t UCL N/A
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL N/A
Kolmogorov-Smirnov Test Statistic	0.551	95% Percentile Bootstrap UCL N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 13.31
		97.5% Chebyshev(Mean, Sd) UCL 14.99
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 18.29
95% Approximate Gamma UCL	15.44	
95% Adjusted Gamma UCL	16.69	

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 18.29

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	195-11.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Aluminum was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 6

Raw Statistics

		Log-transformed Statistics	
Minimum	7.54	Minimum of Log Data	2.02
Maximum	24.6	Maximum of Log Data	3.203
Mean	11.13	Mean of log Data	2.358
Median		11 SD of log Data	0.309
SD	4.489		
Coefficient of Variation	0.403		
Skewness	2.79		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.596	Shapiro Wilk Test Statistic	0.73
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	13.46	95% H-UCL	13.28
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	15.38
95% Adjusted-CLT UCL (Chen-1995)	14.38	97.5% Chebyshev (MVUE) UCL	17.25
95% Modified-t UCL (Johnson-1978)	13.63	99% Chebyshev (MVUE) UCL	20.94

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	7.433	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.497		
MLE of Mean	11.13		
MLE of Standard Deviation	4.082		
nu star	178.4		
Approximate Chi Square Value (.05)	148.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	13.26
Adjusted Chi Square Value	144.3	95% Jackknife UCL	13.46
		95% Standard Bootstrap UCL	13.18
Anderson-Darling Test Statistic	1.551	95% Bootstrap-t UCL	15.74
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	22.09
Kolmogorov-Smirnov Test Statistic	0.389	95% Percentile Bootstrap UCL	13.59
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	14.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.78
		97.5% Chebyshev(Mean, Sd) UCL	19.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	24.02
95% Approximate Gamma UCL	13.37		
95% Adjusted Gamma UCL	13.75		

Potential UCL to Use

Use 95% Student's-t UCL 13.46
or 95% Modified-t UCL 13.63

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Barium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	32.91	Minimum of Log Data	3.494
Maximum	85	Maximum of Log Data	4.443
Mean	58.77	Mean of log Data	3.998
Median	48.11	SD of log Data	0.407
SD	23.59		
Coefficient of Variation	0.401		
Skewness	0.27		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Test Statistic	0.752	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	71	95% H-UCL	76
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	89.38
95% Adjusted-CLT UCL (Chen-1995)	70.54	97.5% Chebyshev (MVUE) UCL	102.6
95% Modified-t UCL (Johnson-1978)	71.09	99% Chebyshev (MVUE) UCL	128.6

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	5.13	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.46		
MLE of Mean	58.77		
MLE of Standard Deviation	25.95		
nu star	123.1		
Approximate Chi Square Value (.05)	98.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	69.97
Adjusted Chi Square Value	95.14	95% Jackknife UCL	71
		95% Standard Bootstrap UCL	69.33
Anderson-Darling Test Statistic	1.265	95% Bootstrap-t UCL	73.37
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	68.04
Kolmogorov-Smirnov Test Statistic	0.291	95% Percentile Bootstrap UCL	69.6
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	70.74
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	88.45
		97.5% Chebyshev(Mean, Sd) UCL	101.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	126.5
95% Approximate Gamma UCL	73.46		
95% Adjusted Gamma UCL	76.06		

Potential UCL to Use

Use 95% Student's-t UCL 71
or 95% Modified-t UCL 71.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Iron

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	9455	Minimum of Log Data	9.154
Maximum	46000	Maximum of Log Data	10.74
Mean	14416	Mean of log Data	9.454
Median	10830	SD of log Data	0.44
SD	10199		
Coefficient of Variation	0.707		
Skewness	3.183		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.503	Shapiro Wilk Test Statistic	0.656
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19703	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	18503
95% Adjusted-CLT UCL (Chen-1995)	22149	95% Chebyshev (MVUE) UCL	21801
95% Modified-t UCL (Johnson-1978)	20154	97.5% Chebyshev (MVUE) UCL	25203
		99% Chebyshev (MVUE) UCL	31888

Gamma Distribution Test

k star (bias corrected)	3.249	Data Distribution	
Theta Star	4437	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	14416		
MLE of Standard Deviation	7998		
nu star	77.97		
Approximate Chi Square Value (.05)	58.63	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	19258
Adjusted Chi Square Value	56.07	95% Jackknife UCL	19703
		95% Standard Bootstrap UCL	19163
Anderson-Darling Test Statistic	1.951	95% Bootstrap-t UCL	42354
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	37581
Kolmogorov-Smirnov Test Statistic	0.304	95% Percentile Bootstrap UCL	19927
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	22818
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27249
		97.5% Chebyshev(Mean, Sd) UCL	32802
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	43710
95% Approximate Gamma UCL	19171		
95% Adjusted Gamma UCL	20044		

Potential UCL to Use

Use 95% Student's-t UCL 19703
or 95% Modified-t UCL 20154

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	38.9	Log-transformed Statistics	
Maximum	73.09	Minimum of Log Data	3.661
Mean	63.5	Maximum of Log Data	4.292
Median	65	Mean of log Data	4.141
SD	8.088	SD of log Data	0.155
Coefficient of Variation	0.127		
Skewness	-2.88		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.487	Shapiro Wilk Test Statistic	0.451
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.69	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.27
95% Adjusted-CLT UCL (Chen-1995)	65.27	95% Chebyshev (MVUE) UCL	76.02
95% Modified-t UCL (Johnson-1978)	67.37	97.5% Chebyshev (MVUE) UCL	81.4
		99% Chebyshev (MVUE) UCL	91.96

Gamma Distribution Test

k star (bias corrected)	39.05	Data Distribution	
Theta Star	1.626	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.5		
MLE of Standard Deviation	10.16		
nu star	937.3		

Approximate Chi Square Value (.05)	867.2	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	67.34
Adjusted Chi Square Value	856.9	95% Jackknife UCL	67.69

Anderson-Darling Test Statistic	3.223	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.502	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	73.68
		97.5% Chebyshev(Mean, Sd) UCL	78.08
		99% Chebyshev(Mean, Sd) UCL	86.73

Assuming Gamma Distribution

95% Approximate Gamma UCL	68.63		
95% Adjusted Gamma UCL	69.45		

Potential UCL to Use		Use 95% Student's-t UCL	67.69
		or 95% Modified-t UCL	67.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File

195-12.wst

Full Precision

OFF

Confidence Coefficient

95%

Number of Bootstrap Operations

2000

Beryllium

General Statistics

Number of Valid Observations

15 Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 10

Raw Statistics

		Log-transformed Statistics	
Minimum	30.41	Minimum of Log Data	3.415
Maximum	85	Maximum of Log Data	4.443
Mean	59.66	Mean of log Data	4.01
Median	48.19	SD of log Data	0.416
SD	23.58		
Coefficient of Variation	0.395		
Skewness	0.0859		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic	0.809
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.38	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	74.95
95% Adjusted-CLT UCL (Chen-1995)	69.82	95% Chebyshev (MVUE) UCL	88.32
95% Modified-t UCL (Johnson-1978)	70.4	97.5% Chebyshev (MVUE) UCL	100.7
		99% Chebyshev (MVUE) UCL	124.9

Gamma Distribution Test

k star (bias corrected)	5.283	Data Distribution	
Theta Star	11.29	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	59.66		
MLE of Standard Deviation	25.95		
nu star	158.5		
Approximate Chi Square Value (.05)	130.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	69.67
Adjusted Chi Square Value	127.3	95% Jackknife UCL	70.38
		95% Standard Bootstrap UCL	69.3
Anderson-Darling Test Statistic	1.4	95% Bootstrap-t UCL	70.76
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	68.96
Kolmogorov-Smirnov Test Statistic	0.262	95% Percentile Bootstrap UCL	69.76
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	69.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	86.19
		97.5% Chebyshev(Mean, Sd) UCL	97.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	120.2
95% Approximate Gamma UCL	72.52		
95% Adjusted Gamma UCL	74.3		

Potential UCL to Use

Use 95% Student's-t UCL 70.38
or 95% Modified-t UCL 70.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 4

Raw Statistics

Minimum	11.2	Minimum of Log Data	2.416
Maximum	68.97	Maximum of Log Data	4.234
Mean	61.4	Mean of log Data	4.057
Median	65	SD of log Data	0.455
SD	13.97		
Coefficient of Variation	0.228		
Skewness	-3.791		

Log-transformed Statistics

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.355	Shapiro Wilk Test Statistic	0.318
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995)
 95% Modified-t UCL (Johnson-1978)

Assuming Lognormal Distribution

67.75	95% H-UCL	81.89
	95% Chebyshev (MVUE) UCL	96.94
63.56	97.5% Chebyshev (MVUE) UCL	111.4
67.16	99% Chebyshev (MVUE) UCL	139.7

Gamma Distribution Test

k star (bias corrected) 6.762
 Theta Star 9.079
 MLE of Mean 61.4
 MLE of Standard Deviation 23.61
 nu star 202.9

Data Distribution

Data do not follow a Discernable Distribution (0.05)
 170.9 Nonparametric Statistics

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.0324
 Adjusted Chi Square Value 167.3

Nonparametric Statistics

0.0324	95% CLT UCL	67.33
167.3	95% Jackknife UCL	67.75
	95% Standard Bootstrap UCL	67.08
4.827	95% Bootstrap-t UCL	65.88
0.738	95% Hall's Bootstrap UCL	65.05
0.478	95% Percentile Bootstrap UCL	65.26
0.222	95% BCA Bootstrap UCL	64.98
	95% Chebyshev(Mean, Sd) UCL	77.12
	97.5% Chebyshev(Mean, Sd) UCL	83.93
	99% Chebyshev(Mean, Sd) UCL	97.29

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 0.738
 Kolmogorov-Smirnov Test Statistic 0.478
 Kolmogorov-Smirnov 5% Critical Value 0.222
 Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 72.87
 95% Adjusted Gamma UCL 74.45

Potential UCL to Use

Use 95% Student's-t UCL 67.75
 or 95% Modified-t UCL 67.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-13.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Chromium			
General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	36.31	Minimum of Log Data	3.592
Maximum	85	Maximum of Log Data	4.443
Mean	68.62	Mean of log Data	4.182
Median	85	SD of log Data	0.333
SD	20.08		
Coefficient of Variation	0.293		
Skewness	-0.62		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.761	Shapiro Wilk Test Statistic	0.765
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	78.54	95% H-UCL	83.37
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	96.96
95% Adjusted-CLT UCL (Chen-1995)	76.75	97.5% Chebyshev (MVUE) UCL	109.1
95% Modified-t UCL (Johnson-1978)	78.38	99% Chebyshev (MVUE) UCL	133
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	8.357	Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.211		
MLE of Mean	68.62		
MLE of Standard Deviation	23.74		
nu star	217.3		
Approximate Chi Square Value (.05)	184.2	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	77.78
Adjusted Chi Square Value	179.8	95% Jackknife UCL	78.54
		95% Standard Bootstrap UCL	77.71
Anderson-Darling Test Statistic	1.45	95% Bootstrap-t UCL	77.32
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	76.13
Kolmogorov-Smirnov Test Statistic	0.335	95% Percentile Bootstrap UCL	77.01
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	77.07
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	92.89
		97.5% Chebyshev(Mean, Sd) UCL	103.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	124
95% Approximate Gamma UCL	80.96		
95% Adjusted Gamma UCL	82.91		
Potential UCL to Use		Use 95% Student's-t UCL	78.54
		or 95% Modified-t UCL	78.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 3

Raw Statistics

		Log-transformed Statistics	
Minimum	11.3	Minimum of Log Data	2.425
Maximum	73.51	Maximum of Log Data	4.297
Mean	61.52	Mean of log Data	4.049
Median	65	SD of log Data	0.489
SD	15.27		
Coefficient of Variation	0.248		
Skewness	-3.44		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.397	Shapiro Wilk Test Statistic	0.351
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	69.07	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	86.97
95% Adjusted-CLT UCL (Chen-1995)	64.17	95% Chebyshev (MVUE) UCL	102.8
95% Modified-t UCL (Johnson-1978)	68.4	97.5% Chebyshev (MVUE) UCL	119.6
		99% Chebyshev (MVUE) UCL	152.6

Gamma Distribution Test

k star (bias corrected)	5.659	Data Distribution	
Theta Star	10.87	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	61.52		
MLE of Standard Deviation	25.86		
nu star	147.1		
Approximate Chi Square Value (.05)	120.1	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	68.49
Adjusted Chi Square Value	116.6	95% Jackknife UCL	69.07
		95% Standard Bootstrap UCL	N/A

Anderson-Darling Test Statistic	4.101	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.531	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	79.99
		97.5% Chebyshev(Mean, Sd) UCL	87.98
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	103.7
95% Approximate Gamma UCL	75.37		
95% Adjusted Gamma UCL	77.62		

Potential UCL to Use Use 95% Student's-t UCL 69.07
 or 95% Modified-t UCL 68.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-14.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Chromium			
General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	18.2	Minimum of Log Data	2.901
Maximum	85	Maximum of Log Data	4.443
Mean	63.66	Mean of log Data	4.043
Median	85	SD of log Data	0.535
SD	26.27		
Coefficient of Variation	0.413		
Skewness	-0.66		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Test Statistic	0.771	Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	0.866	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	76.64	95% H-UCL	91.67
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	108.2
95% Adjusted-CLT UCL (Chen-1995)	74.22	97.5% Chebyshev (MVUE) UCL	126.9
95% Modified-t UCL (Johnson-1978)	76.42	99% Chebyshev (MVUE) UCL	163.6
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.652	Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.43		
MLE of Mean	63.66		
MLE of Standard Deviation	33.31		
nu star	94.94		
Approximate Chi Square Value (.05)	73.47	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	75.64
Adjusted Chi Square Value	70.78	95% Jackknife UCL	76.64
		95% Standard Bootstrap UCL	75.53
Anderson-Darling Test Statistic	1.378	95% Bootstrap-t UCL	75.01
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	73.65
Kolmogorov-Smirnov Test Statistic	0.329	95% Percentile Bootstrap UCL	74.73
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	74.72
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	95.42
		97.5% Chebyshev(Mean, Sd) UCL	109.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	136.2
95% Approximate Gamma UCL	82.26		
95% Adjusted Gamma UCL	85.38		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	95.42

Recommended UCL exceeds the maximum observation
 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	57.88	Minimum of Log Data	4.058
Maximum	82.18	Maximum of Log Data	4.409
Mean	67.2	Mean of log Data	4.204
Median	65	SD of log Data	0.0905
SD	6.388		
Coefficient of Variation	0.095		
Skewness	1.477		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.715	Shapiro Wilk Test Statistic	0.733
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.36	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	70.89	95% Chebyshev (MVUE) UCL	74.55
95% Modified-t UCL (Johnson-1978)	70.48	97.5% Chebyshev (MVUE) UCL	77.73
		99% Chebyshev (MVUE) UCL	83.99

Gamma Distribution Test

k star (bias corrected)	98.72	Data Distribution	
Theta Star	0.681	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	67.2		
MLE of Standard Deviation	6.763		
nu star	2567		
Approximate Chi Square Value (.05)	2450	Nonparametric Statistics	
Adjusted Level of Significance	0.03	95% CLT UCL	70.11
Adjusted Chi Square Value	2434	95% Jackknife UCL	70.36
		95% Standard Bootstrap UCL	69.92
Anderson-Darling Test Statistic	1.995	95% Bootstrap-t UCL	73.19
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	92.58
Kolmogorov-Smirnov Test Statistic	0.404	95% Percentile Bootstrap UCL	70.1
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	70.78
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.92
		97.5% Chebyshev(Mean, Sd) UCL	78.26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	84.83
95% Approximate Gamma UCL	70.4		
95% Adjusted Gamma UCL	70.87		

Potential UCL to Use

Use 95% Student's-t UCL 70.36
or 95% Modified-t UCL 70.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

195-15.wst
 OFF
 95%
 2000

Chromium

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 8

Raw Statistics

Minimum	8	Minimum of Log Data	2.079
Maximum	85	Maximum of Log Data	4.443
Mean	59.78	Mean of log Data	3.935
Median	66.59	SD of log Data	0.671
SD	27.63		
Coefficient of Variation	0.462		
Skewness	-0.39		

Log-transformed Statistics

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.755
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	72.86	95% H-UCL	98.44
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	114.4
95% Adjusted-CLT UCL (Chen-1995)	71.1	97.5% Chebyshev (MVUE) UCL	136.7
95% Modified-t UCL (Johnson-1978)	72.73	99% Chebyshev (MVUE) UCL	180.4

Assuming Lognormal Distribution

Gamma Distribution Test

k star (bias corrected)	2.699	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	22.15		
MLE of Mean	59.78		
MLE of Standard Deviation	36.39		
nu star	75.56		
Approximate Chi Square Value (.05)	56.54	Nonparametric Statistics	
Adjusted Level of Significance	0.031	95% CLT UCL	71.93
Adjusted Chi Square Value	54.36	95% Jackknife UCL	72.86
		95% Standard Bootstrap UCL	71.47
Anderson-Darling Test Statistic	1.199	95% Bootstrap-t UCL	71.82
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	70.9
Kolmogorov-Smirnov Test Statistic	0.306	95% Percentile Bootstrap UCL	71.57
Kolmogorov-Smirnov 5% Critical Value	0.23	95% BCA Bootstrap UCL	70.48
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	91.97
		97.5% Chebyshev(Mean, Sd) UCL	105.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	133.3
95% Approximate Gamma UCL	79.9		
95% Adjusted Gamma UCL	83.1		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 91.97

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

195-16.wst
 OFF
 95%
 2000

Chromium

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics

Minimum 35.25
 Maximum 85
 Mean 73.72
 Median 85
 SD 20.26
 Coefficient of Variation 0.275
 Skewness -1.304

Log-transformed Statistics

Minimum of Log Data 3.562
 Maximum of Log Data 4.443
 Mean of log Data 4.253
 SD of log Data 0.343

Relevant UCL Statistics

Normal Distribution Test
 Shapiro Wilk Test Statistic 0.571
 Shapiro Wilk Critical Value 0.887
 Data not Normal at 5% Significance Level

Lognormal Distribution Test
 Shapiro Wilk Test Statistic 0.58
 Shapiro Wilk Critical Value 0.887
 Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 82.59
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 80.28
 95% Modified-t UCL (Johnson-1978) 82.32

Assuming Lognormal Distribution

95% H-UCL 88.22
 95% Chebyshev (MVUE) UCL 102.4
 97.5% Chebyshev (MVUE) UCL 114.6
 99% Chebyshev (MVUE) UCL 138.5

Gamma Distribution Test

k star (bias corrected) 8.691
 Theta Star 8.482
 MLE of Mean 73.72
 MLE of Standard Deviation 25.01
 nu star 278.1

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.0335
 Adjusted Chi Square Value 236.5

Nonparametric Statistics

95% CLT UCL 82.05
 95% Jackknife UCL 82.59
 95% Standard Bootstrap UCL 81.54
 95% Bootstrap-t UCL 81.08
 95% Hall's Bootstrap UCL 80.33
 95% Percentile Bootstrap UCL 81.89
 95% BCA Bootstrap UCL 79.63
 95% Chebyshev(Mean, Sd) UCL 95.79
 97.5% Chebyshev(Mean, Sd) UCL 105.3
 99% Chebyshev(Mean, Sd) UCL 124.1

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 0.739
 Kolmogorov-Smirnov Test Statistic 0.468
 Kolmogorov-Smirnov 5% Critical Value 0.215
 Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 85.25
 95% Adjusted Gamma UCL 86.68

Potential UCL to Use

Use 95% Student's-t UCL 82.59
 or 95% Modified-t UCL 82.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 16 Number of Distinct Observations 5

Raw Statistics

		Log-transformed Statistics	
Minimum	7.6	Minimum of Log Data	2.028
Maximum	85.7	Maximum of Log Data	4.451
Mean	63.96	Mean of log Data	4.075
Median	65	SD of log Data	0.552
SD	16.16		
Coefficient of Variation	0.253		
Skewness	-2.992		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.528	Shapiro Wilk Test Statistic	0.376
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.04	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	92.55
95% Adjusted-CLT UCL (Chen-1995)	67.38	95% Chebyshev (MVUE) UCL	110.2
95% Modified-t UCL (Johnson-1978)	70.54	97.5% Chebyshev (MVUE) UCL	128.5
		99% Chebyshev (MVUE) UCL	164.5

Gamma Distribution Test

k star (bias corrected)	5.077	Data Distribution	
Theta Star	12.6	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.96		
MLE of Standard Deviation	28.39		
nu star	162.5		
Approximate Chi Square Value (.05)	134	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	70.6
Adjusted Chi Square Value	131	95% Jackknife UCL	71.04
		95% Standard Bootstrap UCL	70.49
Anderson-Darling Test Statistic	4.203	95% Bootstrap-t UCL	69.02
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	68.4
Kolmogorov-Smirnov Test Statistic	0.507	95% Percentile Bootstrap UCL	69.37
Kolmogorov-Smirnov 5% Critical Value	0.216	95% BCA Bootstrap UCL	68.35
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.57
		97.5% Chebyshev(Mean, Sd) UCL	89.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.2
95% Approximate Gamma UCL	77.55		
95% Adjusted Gamma UCL	79.29		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 81.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File	195-17.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Chromium			
General Statistics			
Number of Valid Observations	23	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	33.69	Minimum of Log Data	3.517
Maximum	120.8	Maximum of Log Data	4.794
Mean	73.86	Mean of log Data	4.244
Median	85	SD of log Data	0.369
SD	23.2		
Coefficient of Variation	0.314		
Skewness	-0.45		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.818	Shapiro Wilk Test Statistic	0.782
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	82.17	95% H-UCL	86.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.84
95% Adjusted-CLT UCL (Chen-1995)	81.34	97.5% Chebyshev (MVUE) UCL	110.9
95% Modified-t UCL (Johnson-1978)	82.09	99% Chebyshev (MVUE) UCL	132.5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	7.644	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.663		
MLE of Mean	73.86		
MLE of Standard Deviation	26.72		
nu star	351.6		
Approximate Chi Square Value (.05)	309.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	81.82
Adjusted Chi Square Value	306.3	95% Jackknife UCL	82.17
		95% Standard Bootstrap UCL	81.85
Anderson-Darling Test Statistic	2.574	95% Bootstrap-t UCL	81.8
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	81.1
Kolmogorov-Smirnov Test Statistic	0.357	95% Percentile Bootstrap UCL	81.46
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	81
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.95
		97.5% Chebyshev(Mean, Sd) UCL	104.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	122
95% Approximate Gamma UCL	84.01		
95% Adjusted Gamma UCL	84.8		
Potential UCL to Use		Use 95% Student's-t UCL	82.17
		or 95% Modified-t UCL	82.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 3

Raw Statistics

Minimum	0.417	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-0.875
Mean	9.564	Maximum of Log Data	2.303
Median	10	Mean of log Data	2.163
SD	1.996	SD of log Data	0.662
Coefficient of Variation	0.209		
Skewness	-4.78		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.23	Shapiro Wilk Test Statistic	0.22
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.28	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.61
95% Adjusted-CLT UCL (Chen-1995)	9.806	95% Chebyshev (MVUE) UCL	17.57
95% Modified-t UCL (Johnson-1978)	10.21	97.5% Chebyshev (MVUE) UCL	20.54
		99% Chebyshev (MVUE) UCL	26.37

Gamma Distribution Test

k star (bias corrected)	4.72	Data Distribution	
Theta Star	2.026	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.564		
MLE of Standard Deviation	4.402		
nu star	217.1		
Approximate Chi Square Value (.05)	184	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	10.25
Adjusted Chi Square Value	181.8	95% Jackknife UCL	10.28
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	8.394	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.514	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.38
		97.5% Chebyshev(Mean, Sd) UCL	12.16
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.71
95% Approximate Gamma UCL	11.28		
95% Adjusted Gamma UCL	11.42		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 11.38

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 5

Raw Statistics

Minimum	51	Log-transformed Statistics	
Maximum	65	Minimum of Log Data	3.932
Mean	63.73	Maximum of Log Data	4.174
Median	65	Mean of log Data	4.153
SD	3.453	SD of log Data	0.0588
Coefficient of Variation	0.0542		
Skewness	-2.978		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.43
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.96	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	64.43	95% Chebyshev (MVUE) UCL	67.14
95% Modified-t UCL (Johnson-1978)	64.89	97.5% Chebyshev (MVUE) UCL	68.61
		99% Chebyshev (MVUE) UCL	71.51

Gamma Distribution Test

k star (bias corrected)	278.1	Data Distribution	
Theta Star	0.229	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.73		
MLE of Standard Deviation	3.821		
nu star	12793		
Approximate Chi Square Value (.05)	12531	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	64.91
Adjusted Chi Square Value	12512	95% Jackknife UCL	64.96
		95% Standard Bootstrap UCL	64.87
Anderson-Darling Test Statistic	6.102	95% Bootstrap-t UCL	64.67
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	64.53
Kolmogorov-Smirnov Test Statistic	0.472	95% Percentile Bootstrap UCL	64.64
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	64.51
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	66.86
		97.5% Chebyshev(Mean, Sd) UCL	68.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	70.89
95% Approximate Gamma UCL	65.06		
95% Adjusted Gamma UCL	65.16		

Potential UCL to Use

Use 95% Student's-t UCL 64.96
or 95% Modified-t UCL 64.89

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 3

Raw Statistics

Minimum	0.74	Log-transformed Statistics	
Maximum	5	Minimum of Log Data	-0.301
Mean	4.806	Maximum of Log Data	1.609
Median	5	Mean of log Data	1.525
SD	0.887	SD of log Data	0.398
Coefficient of Variation	0.185		
Skewness	-4.78		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.23	Shapiro Wilk Test Statistic	0.222
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.124	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	5.838
95% Adjusted-CLT UCL (Chen-1995)	4.914	95% Chebyshev (MVUE) UCL	6.793
95% Modified-t UCL (Johnson-1978)	5.093	97.5% Chebyshev (MVUE) UCL	7.588
		99% Chebyshev (MVUE) UCL	9.151

Gamma Distribution Test

k star (bias corrected)	9.772	Data Distribution	
Theta Star	0.492	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.806		
MLE of Standard Deviation	1.538		
nu star	449.5		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0389	Nonparametric Statistics	
Adjusted Chi Square Value	398.1	95% CLT UCL	5.111
		95% Jackknife UCL	5.124
		95% Standard Bootstrap UCL	N/A

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	8.272	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.505	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	N/A

Data not Gamma Distributed at 5% Significance Level

		95% Chebyshev(Mean, Sd) UCL	5.613
		97.5% Chebyshev(Mean, Sd) UCL	5.962
		99% Chebyshev(Mean, Sd) UCL	6.647

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.383
95% Adjusted Gamma UCL	5.428

Potential UCL to Use

Use 95% Student's-t UCL	5.124
or 95% Modified-t UCL	5.093

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 4

Raw Statistics

Minimum	0.59	Log-transformed Statistics	
Maximum	10.14	Minimum of Log Data	-0.528
Mean	9.579	Maximum of Log Data	2.316
Median	10	Mean of log Data	2.178
SD	1.962	SD of log Data	0.59
Coefficient of Variation	0.205		
Skewness	-4.778		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.236	Shapiro Wilk Test Statistic	0.223
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.28	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.61
95% Adjusted-CLT UCL (Chen-1995)	9.816	95% Chebyshev (MVUE) UCL	16.3
95% Modified-t UCL (Johnson-1978)	10.21	97.5% Chebyshev (MVUE) UCL	18.85
		99% Chebyshev (MVUE) UCL	23.85

Gamma Distribution Test

k star (bias corrected)	5.52	Data Distribution	
Theta Star	1.735	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.579		
MLE of Standard Deviation	4.077		
nu star	253.9		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0389	218 Nonparametric Statistics	
Adjusted Chi Square Value	215.6	95% CLT UCL	10.25
		95% Jackknife UCL	10.28
		95% Standard Bootstrap UCL	10.26
Anderson-Darling Test Statistic	8.311	95% Bootstrap-t UCL	10.07
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	9.985
Kolmogorov-Smirnov Test Statistic	0.509	95% Percentile Bootstrap UCL	10.01
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	9.988
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.36
		97.5% Chebyshev(Mean, Sd) UCL	12.13
		99% Chebyshev(Mean, Sd) UCL	13.65

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.16
95% Adjusted Gamma UCL	11.28

Potential UCL to Use

	Use 95% Chebyshev (Mean, Sd) UCL	11.36
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	541-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	18
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Raw Statistics

Minimum	7240	Log-transformed Statistics	
Maximum	19200	Minimum of Log Data	8.887
Mean	14049	Maximum of Log Data	9.863
Median	14049	Mean of log Data	9.534
SD	2411	SD of log Data	0.195
Coefficient of Variation	0.172		
Skewness	-0.789		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.927	Shapiro Wilk Test Statistic	0.85
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	14913	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15154
95% Adjusted-CLT UCL (Chen-1995)	14788	95% Chebyshev (MVUE) UCL	16583
95% Modified-t UCL (Johnson-1978)	14899	97.5% Chebyshev (MVUE) UCL	17669
		99% Chebyshev (MVUE) UCL	19803

Gamma Distribution Test

k star (bias corrected)	26.47	Data Distribution	
Theta Star	530.7	Data appear Normal at 5% Significance Level	
MLE of Mean	14049		
MLE of Standard Deviation	2731		
nu star	1218		
Approximate Chi Square Value (.05)	1138	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	14876
Adjusted Chi Square Value	1132	95% Jackknife UCL	14913
		95% Standard Bootstrap UCL	14863
Anderson-Darling Test Statistic	0.986	95% Bootstrap-t UCL	14811
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	14835
Kolmogorov-Smirnov Test Statistic	0.22	95% Percentile Bootstrap UCL	14842
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	14756
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16241
		97.5% Chebyshev(Mean, Sd) UCL	17190
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19053
95% Approximate Gamma UCL	15038		
95% Adjusted Gamma UCL	15112		

Potential UCL to Use		Use 95% Student's-t UCL	14913
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Americium-241

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

Minimum -0.00445
 Maximum 27.3
 Mean 2.25
 Median 0.00483
 SD 5.812
 Coefficient of Variation 2.583
 Skewness 4.023

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.418
 Shapiro Wilk Critical Value 0.914
 Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 4.331

Assuming Normal Distribution

95% Student's-t UCL 4.331

Assuming Lognormal Distribution

95% H-UCL N/A
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen 1995) 5.33
 95% Modified-t UCL (Johnson-1978) 4.5

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 7.532

95% CLT UCL 4.243
 95% Jackknife UCL 4.331
 95% Standard Bootstrap UCL 4.247
 95% Bootstrap-t UCL 11.03
 95% Hall's Bootstrap UCL 12.88
 95% Percentile Bootstrap UCL 4.424
 95% BCA Bootstrap UCL 5.925
 95% Chebyshev(Mean, Sd) UCL 7.532
 97.5% Chebyshev(Mean, Sd) UCL 9.818
 99% Chebyshev(Mean, Sd) UCL 14.31

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

		Log-transformed Statistics	
Minimum	1.87	Minimum of Log Data	0.626
Maximum	23.3	Maximum of Log Data	3.148
Mean	7.701	Mean of log Data	1.954
Median	7.29	SD of log Data	0.423
SD	3.847		
Coefficient of Variation	0.5		
Skewness	3.16		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.799
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.079	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.171
95% Adjusted-CLT UCL (Chen-1995)	9.585	95% Chebyshev (MVUE) UCL	10.73
95% Modified-t UCL (Johnson-1978)	9.167	97.5% Chebyshev (MVUE) UCL	12.04
		99% Chebyshev (MVUE) UCL	14.63

Gamma Distribution Test

k star (bias corrected)	5.171	Data Distribution	
Theta Star	1.489	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.701		
MLE of Standard Deviation	3.387		
nu star	237.9	Nonparametric Statistics	
Approximate Chi Square Value (.05)	203.2	95% CLT UCL	9.021
Adjusted Level of Significance	0.0389	95% Jackknife UCL	9.079
Adjusted Chi Square Value	200.9	95% Standard Bootstrap UCL	8.967
Anderson-Darling Test Statistic	1.909	95% Bootstrap-t UCL	10.42
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	15.87
Kolmogorov-Smirnov Test Statistic	0.265	95% Percentile Bootstrap UCL	9.095
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	9.782
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.2
		97.5% Chebyshev(Mean, Sd) UCL	12.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.68
95% Approximate Gamma UCL	9.017		
95% Adjusted Gamma UCL	9.121		

Potential UCL to Use

Use 95% Student's-t UCL 9.079
or 95% Modified-t UCL 9.167

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 17

Raw Statistics

Minimum	71.4	Log-transformed Statistics	
Maximum	230	Minimum of Log Data	4.268
Mean	123.6	Maximum of Log Data	5.438
Median	123.6	Mean of log Data	4.784
SD	34.43	SD of log Data	0.256
Coefficient of Variation	0.279		
Skewness	1.537		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.849	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	135.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	136.3
95% Adjusted-CLT UCL (Chen-1995)	137.9	95% Chebyshev (MVUE) UCL	152.5
95% Modified-t UCL (Johnson-1978)	136.3	97.5% Chebyshev (MVUE) UCL	165
		99% Chebyshev (MVUE) UCL	189.7

Gamma Distribution Test

k star (bias corrected)	13.46	Data Distribution	
Theta Star	9.18	Data appear Lognormal at 5% Significance Level	
MLE of Mean	123.6		
MLE of Standard Deviation	33.68		
nu star	619.3		
Approximate Chi Square Value (.05)	562.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	135.4
Adjusted Chi Square Value	558.7	95% Jackknife UCL	135.9
		95% Standard Bootstrap UCL	135.4
Anderson-Darling Test Statistic	0.949	95% Bootstrap-t UCL	139.8
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	148.1
Kolmogorov-Smirnov Test Statistic	0.214	95% Percentile Bootstrap UCL	135.2
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	137.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	154.9
		97.5% Chebyshev(Mean, Sd) UCL	168.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	195
95% Approximate Gamma UCL	136.1		
95% Adjusted Gamma UCL	137		

Potential UCL to Use

Use 95% Student's-t UCL	135.9
or 95% Modified-t UCL	136.3
or 95% H-UCL	136.3

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

		Log-transformed Statistics	
Minimum	0.424	Minimum of Log Data	-0.858
Maximum	1.46	Maximum of Log Data	0.378
Mean	0.645	Mean of log Data	-0.5
Median	0.577	SD of log Data	0.333
SD	0.267		
Coefficient of Variation	0.414		
Skewness	2.048		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.728	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.74	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.731
95% Adjusted-CLT UCL (Chen-1995)	0.762	95% Chebyshev (MVUE) UCL	0.837
95% Modified-t UCL (Johnson-1978)	0.744	97.5% Chebyshev (MVUE) UCL	0.923
		99% Chebyshev (MVUE) UCL	1.09

Gamma Distribution Test

k star (bias corrected)	7.303	Data Distribution	
Theta Star	0.0883	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.645		
MLE of Standard Deviation	0.239		
nu star	335.9		
Approximate Chi Square Value (.05)	294.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.736
Adjusted Chi Square Value	291.7	95% Jackknife UCL	0.74
		95% Standard Bootstrap UCL	0.736
Anderson-Darling Test Statistic	1.601	95% Bootstrap-t UCL	0.799
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.827
Kolmogorov-Smirnov Test Statistic	0.28	95% Percentile Bootstrap UCL	0.74
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	0.759
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.887
		97.5% Chebyshev(Mean, Sd) UCL	0.992
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.198
95% Approximate Gamma UCL	0.736		
95% Adjusted Gamma UCL	0.743		

Potential UCL to Use

Use 95% Student's-t UCL	0.74
or 95% Modified-t UCL	0.744

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 17

Raw Statistics

Minimum	0.481	Log-transformed Statistics	
Maximum	2.75	Minimum of Log Data	-0.732
Mean	1.303	Maximum of Log Data	1.012
Median	1.303	Mean of log Data	0.122
SD	0.701	SD of log Data	0.557
Coefficient of Variation	0.538		
Skewness	0.663		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.88	Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.555	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.677
95% Adjusted-CLT UCL (Chen-1995)	1.566	95% Chebyshev (MVUE) UCL	2.003
95% Modified-t UCL (Johnson-1978)	1.558	97.5% Chebyshev (MVUE) UCL	2.304
		99% Chebyshev (MVUE) UCL	2.894

Gamma Distribution Test

k star (bias corrected)	3.2	Data Distribution	
Theta Star	0.407	3.2 Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	1.303		
MLE of Standard Deviation	0.729		
nu star	147.2		
Approximate Chi Square Value (.05)	120.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	1.544
Adjusted Chi Square Value	118.4	95% Jackknife UCL	1.555
		95% Standard Bootstrap UCL	1.54
Anderson-Darling Test Statistic	0.695	95% Bootstrap-t UCL	1.574
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	1.559
Kolmogorov-Smirnov Test Statistic	0.169	95% Percentile Bootstrap UCL	1.536
Kolmogorov-Smirnov 5% Critical Value	0.183	95% BCA Bootstrap UCL	1.573
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.941
		97.5% Chebyshev(Mean, Sd) UCL	2.217
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.759
95% Approximate Gamma UCL	1.597		
95% Adjusted Gamma UCL	1.621		

Potential UCL to Use Use 95% Approximate Gamma UCL 1.597

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

Minimum	0.0117	Log-transformed Statistics	
Maximum	2.33	Minimum of Log Data	-4.448
Mean	0.456	Maximum of Log Data	0.846
Median	0.251	Mean of log Data	-1.302
SD	0.567	SD of log Data	1.084
Coefficient of Variation	1.242		
Skewness	2.589		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.625	Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.659	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.901
95% Adjusted-CLT UCL (Chen-1995)	0.719	95% Chebyshev (MVUE) UCL	1.004
95% Modified-t UCL (Johnson-1978)	0.67	97.5% Chebyshev (MVUE) UCL	1.234
		99% Chebyshev (MVUE) UCL	1.687

Gamma Distribution Test

k star (bias corrected)	0.988	Data Distribution	
Theta Star	0.462	Data appear Lognormal at 5% Significance Level	
MLE of Mean	0.456		
MLE of Standard Deviation	0.459		
nu star	45.47		
Approximate Chi Square Value (.05)		31 Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.651
Adjusted Chi Square Value	30.13	95% Jackknife UCL	0.659
		95% Standard Bootstrap UCL	0.646
Anderson-Darling Test Statistic	1.055	95% Bootstrap-t UCL	0.955
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	1.597
Kolmogorov-Smirnov Test Statistic	0.203	95% Percentile Bootstrap UCL	0.658
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	0.713
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.972
		97.5% Chebyshev(Mean, Sd) UCL	1.195
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.632
95% Approximate Gamma UCL	0.669		
95% Adjusted Gamma UCL	0.689		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.972

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 22

Raw Statistics

Minimum	10.8	Log-transformed Statistics	
Maximum	3353	Minimum of Log Data	2.38
Mean	614.9	Maximum of Log Data	8.117
Median	463.9	Mean of log Data	5.768
SD	719	SD of log Data	1.341
Coefficient of Variation	1.169		
Skewness	2.687		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.721	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	872.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1859
95% Adjusted-CLT UCL (Chen-1995)	951.3	95% Chebyshev (MVUE) UCL	1806
95% Modified-t UCL (Johnson-1978)	886.4	97.5% Chebyshev (MVUE) UCL	2269
		99% Chebyshev (MVUE) UCL	3179

Gamma Distribution Test

k star (bias corrected)	0.807	Data Distribution	
Theta Star	761.6	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	614.9		
MLE of Standard Deviation	684.4		
nu star	37.14		
Approximate Chi Square Value (.05)	24.19	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	861.5
Adjusted Chi Square Value	23.43	95% Jackknife UCL	872.4
		95% Standard Bootstrap UCL	858.7
Anderson-Darling Test Statistic	0.22	95% Bootstrap-t UCL	1039
Anderson-Darling 5% Critical Value	0.775	95% Hall's Bootstrap UCL	1997
Kolmogorov-Smirnov Test Statistic	0.0906	95% Percentile Bootstrap UCL	893
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	959.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1268
		97.5% Chebyshev(Mean, Sd) UCL	1551
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2107
95% Approximate Gamma UCL	944.2		
95% Adjusted Gamma UCL	974.8		

Potential UCL to Use Use 95% Approximate Gamma UCL 944.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 6

Raw Statistics

Minimum -0.00942
 Maximum 0.0183
 Mean 0.00626
 Median 0.00626
 SD 0.00424
 Coefficient of Variation 0.677
 Skewness -1.373

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.465
 Shapiro Wilk Critical Value 0.914

Lognormal Distribution Test

Not Available

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.00778

Assuming Normal Distribution

95% Student's-t UCL 0.00778

Assuming Lognormal Distribution

95% H-UCL N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995) 0.00744

95% Modified-t UCL (Johnson-1978) 0.00773

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.0101

95% CLT UCL 0.00771

95% Jackknife UCL 0.00778

95% Standard Bootstrap UCL 0.00766

95% Bootstrap-t UCL 0.00743

95% Hall's Bootstrap UCL 0.00764

95% Percentile Bootstrap UCL 0.00757

95% BCA Bootstrap UCL 0.00737

95% Chebyshev(Mean, Sd) UCL 0.0101

97.5% Chebyshev(Mean, Sd) UCL 0.0118

99% Chebyshev(Mean, Sd) UCL 0.0151

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

		Log-transformed Statistics	
Minimum	9980	Minimum of Log Data	9.208
Maximum	29600	Maximum of Log Data	10.3
Mean	17134	Mean of log Data	9.716
Median	17134	SD of log Data	0.255
SD	4708		
Coefficient of Variation	0.275		
Skewness	1.344		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	18820	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	18894
95% Adjusted-CLT UCL (Chen-1995)	19043	95% Chebyshev (MVUE) UCL	21124
95% Modified-t UCL (Johnson-1978)	18866	97.5% Chebyshev (MVUE) UCL	22860
		99% Chebyshev (MVUE) UCL	26269

Gamma Distribution Test

k star (bias corrected)	13.62	Data Distribution	
Theta Star	1258	Data appear Lognormal at 5% Significance Level	
MLE of Mean	17134		
MLE of Standard Deviation	4643		
nu star	626.4		
Approximate Chi Square Value (.05)	569.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	18749
Adjusted Chi Square Value	565.4	95% Jackknife UCL	18820
		95% Standard Bootstrap UCL	18687
Anderson-Darling Test Statistic	0.867	95% Bootstrap-t UCL	19211
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	20343
Kolmogorov-Smirnov Test Statistic	0.186	95% Percentile Bootstrap UCL	18819
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	19273
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21413
		97.5% Chebyshev(Mean, Sd) UCL	23265
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26902
95% Approximate Gamma UCL	18851		
95% Adjusted Gamma UCL	18983		

Potential UCL to Use

Use 95% Student's-t UCL	18820
or 95% Modified-t UCL	18866
or 95% H-UCL	18894

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

Minimum	104	Log-transformed Statistics	
Maximum	821	Minimum of Log Data	4.644
Mean	441.9	Maximum of Log Data	6.711
Median	441.9	Mean of log Data	6.02
SD	153.2	SD of log Data	0.422
Coefficient of Variation	0.347		
Skewness	0.323		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	496.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	534
95% Adjusted-CLT UCL (Chen-1995)	496.7	95% Chebyshev (MVUE) UCL	624.6
95% Modified-t UCL (Johnson-1978)	497.1	97.5% Chebyshev (MVUE) UCL	701
		99% Chebyshev (MVUE) UCL	851.2

Gamma Distribution Test

k star (bias corrected)	6.28	Data Distribution	
Theta Star	70.36	Data appear Normal at 5% Significance Level	
MLE of Mean	441.9		
MLE of Standard Deviation	176.3		
nu star	288.9	Nonparametric Statistics	
Approximate Chi Square Value (.05)	250.5	95% CLT UCL	494.4
Adjusted Level of Significance	0.0389	95% Jackknife UCL	496.7
Adjusted Chi Square Value	247.9	95% Standard Bootstrap UCL	495.8
Anderson-Darling Test Statistic	0.889	95% Bootstrap-t UCL	500.2
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	511.2
Kolmogorov-Smirnov Test Statistic	0.202	95% Percentile Bootstrap UCL	493.8
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	492.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	581.1
		97.5% Chebyshev(Mean, Sd) UCL	641.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	759.8
95% Approximate Gamma UCL	509.6		
95% Adjusted Gamma UCL	514.9		

Potential UCL to Use Use 95% Student's-t UCL 496.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.019	Minimum of Log Data	-3.963
Maximum	0.67	Maximum of Log Data	-0.4
Mean	0.0774	Mean of log Data	-3.109
Median	0.029	SD of log Data	0.868
SD	0.137		
Coefficient of Variation	1.77		
Skewness	4.069		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.423	Shapiro Wilk Test Statistic	0.8
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.126	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.101
95% Adjusted-CLT UCL (Chen-1995)	0.15	95% Chebyshev (MVUE) UCL	0.119
95% Modified-t UCL (Johnson-1978)	0.13	97.5% Chebyshev (MVUE) UCL	0.143
		99% Chebyshev (MVUE) UCL	0.19

Gamma Distribution Test

k star (bias corrected)	0.938	Data Distribution	
Theta Star	0.0825	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0774		
MLE of Standard Deviation	0.0799		
nu star	43.15		
Approximate Chi Square Value (.05)	29.09	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	0.124
Adjusted Chi Square Value	28.25	95% Jackknife UCL	0.126
		95% Standard Bootstrap UCL	0.122
Anderson-Darling Test Statistic	2.626	95% Bootstrap-t UCL	0.297
Anderson-Darling 5% Critical Value	0.768	95% Hall's Bootstrap UCL	0.326
Kolmogorov-Smirnov Test Statistic	0.284	95% Percentile Bootstrap UCL	0.128
Kolmogorov-Smirnov 5% Critical Value	0.187	95% BCA Bootstrap UCL	0.162
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.202
		97.5% Chebyshev(Mean, Sd) UCL	0.256
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.361
95% Approximate Gamma UCL	0.115		
95% Adjusted Gamma UCL	0.118		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.202

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 7

Raw Statistics

		Log-transformed Statistics	
Minimum	0.46	Minimum of Log Data	-0.777
Maximum	1.8	Maximum of Log Data	0.588
Mean	0.555	Mean of log Data	-0.642
Median	0.49	SD of log Data	0.278
SD	0.274		
Coefficient of Variation	0.493		
Skewness	4.658		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.319	Shapiro Wilk Test Statistic	0.426
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995)
 95% Modified-t UCL (Johnson-1978)

Assuming Lognormal Distribution

0.653	95% H-UCL	0.608
	95% Chebyshev (MVUE) UCL	0.685
0.708	97.5% Chebyshev (MVUE) UCL	0.745
0.663	99% Chebyshev (MVUE) UCL	0.864

Gamma Distribution Test

k star (bias corrected) 8.202
 Theta Star 0.0677
 MLE of Mean 0.555
 MLE of Standard Deviation 0.194
 nu star 377.3

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Approximate Chi Square Value (.05)

Adjusted Level of Significance 0.0389
 Adjusted Chi Square Value 330.3

Nonparametric Statistics

333.3	95% CLT UCL	0.649
	95% Jackknife UCL	0.653
	95% Standard Bootstrap UCL	0.648
5.176	95% Bootstrap-t UCL	1.099
0.744	95% Hall's Bootstrap UCL	1.014
0.413	95% Percentile Bootstrap UCL	0.666
0.182	95% BCA Bootstrap UCL	0.728
	95% Chebyshev(Mean, Sd) UCL	0.804
	97.5% Chebyshev(Mean, Sd) UCL	0.912
	99% Chebyshev(Mean, Sd) UCL	1.123

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 5.176
 Kolmogorov-Smirnov Test Statistic 0.744
 Kolmogorov-Smirnov 5% Critical Value 0.413
 Data not Gamma Distributed at 5% Significance Level 0.182

Assuming Gamma Distribution

95% Approximate Gamma UCL 0.629
 95% Adjusted Gamma UCL 0.634

Potential UCL to Use

Use 95% Student's-t UCL 0.653
 or 95% Modified-t UCL 0.663

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

Minimum -0.0122
 Maximum 0.181
 Mean 0.0196
 Median 0.00651
 SD 0.041
 Coefficient of Variation 2.097
 Skewness 3.258

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.571 Not Available

0.914

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

0.0343

0.0343

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.0399

0.0352

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.0569

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

0.0336

0.0343

0.0333

0.0647

0.104

0.035

0.0409

0.0569

0.073

0.105

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 17

Raw Statistics

Minimum	5.97	Log-transformed Statistics	
Maximum	32.8	Minimum of Log Data	1.787
Mean	13.68	Maximum of Log Data	3.49
Median	13.4	Mean of log Data	2.543
SD	6.03	SD of log Data	0.373
Coefficient of Variation	0.441		
Skewness	2.07E+00		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.764	Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	15.84	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.83
95% Adjusted-CLT UCL (Chen-1995)	16.33	95% Chebyshev (MVUE) UCL	18.32
95% Modified-t UCL (Johnson-1978)	15.93	97.5% Chebyshev (MVUE) UCL	20.36
		99% Chebyshev (MVUE) UCL	24.37

Gamma Distribution Test

k star (bias corrected)	6.17	Data Distribution	
Theta Star	2.217	Data appear Lognormal at 5% Significance Level	
MLE of Mean	13.68		
MLE of Standard Deviation	5.506		
nu star	283.8		
Approximate Chi Square Value (.05)	245.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	15.75
Adjusted Chi Square Value	243.2	95% Jackknife UCL	15.84
		95% Standard Bootstrap UCL	15.62
Anderson-Darling Test Statistic	1.057	95% Bootstrap-t UCL	17.61
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	29.46
Kolmogorov-Smirnov Test Statistic	0.233	95% Percentile Bootstrap UCL	15.79
Kolmogorov-Smirnov 5% Critical Value	0.182	95% BCA Bootstrap UCL	16.43
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	19.16
		97.5% Chebyshev(Mean, Sd) UCL	21.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26.19
95% Approximate Gamma UCL	15.79		
95% Adjusted Gamma UCL	15.96		

Potential UCL to Use

Use 95% Student's-t UCL	15.84
or 95% Modified-t UCL	15.93
or 95% H-UCL	15.83

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 10

Raw Statistics

Minimum	0.1	Log-transformed Statistics	
Maximum	94	Minimum of Log Data	-2.303
Mean	39.79	Maximum of Log Data	4.543
Median	50	Mean of log Data	3.026
SD	24.23	SD of log Data	1.794
Coefficient of Variation	0.609		
Skewness	-0.323		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic	0.66
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	48.46	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	427
95% Adjusted-CLT UCL (Chen-1995)	47.73	95% Chebyshev (MVUE) UCL	269.1
95% Modified-t UCL (Johnson-1978)	48.41	97.5% Chebyshev (MVUE) UCL	347.3
		99% Chebyshev (MVUE) UCL	501.1

Gamma Distribution Test

k star (bias corrected)	0.803	Data Distribution	
Theta Star	49.52	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	39.79		
MLE of Standard Deviation	44.39		
nu star	36.96		
Approximate Chi Square Value (.05)	24.04	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	48.1
Adjusted Chi Square Value	23.28	95% Jackknife UCL	48.46
		95% Standard Bootstrap UCL	48.03
Anderson-Darling Test Statistic	3.45	95% Bootstrap-t UCL	47.96
Anderson-Darling 5% Critical Value	0.775	95% Hall's Bootstrap UCL	48.09
Kolmogorov-Smirnov Test Statistic	0.379	95% Percentile Bootstrap UCL	47.67
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	47.54
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	61.81
		97.5% Chebyshev(Mean, Sd) UCL	71.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	90.06
95% Approximate Gamma UCL	61.16		
95% Adjusted Gamma UCL	63.15		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 61.81

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 22

Raw Statistics

		Log-transformed Statistics	
Minimum	1.40E-04	Minimum of Log Data	-8.874
Maximum	7.63	Maximum of Log Data	2.032
Mean	1.305	Mean of log Data	-2.293
Median	0.42	SD of log Data	3.605
SD	2.054		
Coefficient of Variation	1.575		
Skewness	2.135		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.666	Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.04	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12830
95% Adjusted-CLT UCL (Chen-1995)	2.213	95% Chebyshev (MVUE) UCL	86.41
95% Modified-t UCL (Johnson-1978)	2.072	97.5% Chebyshev (MVUE) UCL	116
		99% Chebyshev (MVUE) UCL	174.2

Gamma Distribution Test

k star (bias corrected)	0.267	Data Distribution	
Theta Star	4.888	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	1.305		
MLE of Standard Deviation	2.525		
nu star	12.28		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0389	Nonparametric Statistics	
Adjusted Chi Square Value	5.082	95% CLT UCL	2.009
		95% Jackknife UCL	2.04
		95% Standard Bootstrap UCL	1.989
Anderson-Darling Test Statistic	0.819	95% Bootstrap-t UCL	2.55
Anderson-Darling 5% Critical Value	0.861	95% Hall's Bootstrap UCL	2.137
Kolmogorov-Smirnov Test Statistic	0.162	95% Percentile Bootstrap UCL	2.073
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	2.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.172
		97.5% Chebyshev(Mean, Sd) UCL	3.979
		99% Chebyshev(Mean, Sd) UCL	5.566

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.961
95% Adjusted Gamma UCL	3.152

Potential UCL to Use

Use 95% Adjusted Gamma UCL 3.152

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 22

Raw Statistics

		Log-transformed Statistics	
Minimum	1.5	Minimum of Log Data	0.405
Maximum	20200	Maximum of Log Data	9.913
Mean	4523	Mean of log Data	7.55
Median	3778	SD of log Data	2.075
SD	4508		
Coefficient of Variation	0.997		
Skewness	2.013		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.813	Shapiro Wilk Test Statistic	0.77
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6137	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	103921
95% Adjusted-CLT UCL (Chen-1995)	6491	95% Chebyshev (MVUE) UCL	43846
95% Modified-t UCL (Johnson-1978)	6203	97.5% Chebyshev (MVUE) UCL	57253
		99% Chebyshev (MVUE) UCL	83587

Gamma Distribution Test

k star (bias corrected)	0.635	Data Distribution	
Theta Star	7120	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	4523		
MLE of Standard Deviation	5675		
nu star	29.22		
Approximate Chi Square Value (.05)	17.88	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	6070
Adjusted Chi Square Value	17.24	95% Jackknife UCL	6137
		95% Standard Bootstrap UCL	6050
Anderson-Darling Test Statistic	0.698	95% Bootstrap-t UCL	6756
Anderson-Darling 5% Critical Value	0.787	95% Hall's Bootstrap UCL	8859
Kolmogorov-Smirnov Test Statistic	0.21	95% Percentile Bootstrap UCL	6110
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	6612
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8621
		97.5% Chebyshev(Mean, Sd) UCL	10394
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13877
95% Approximate Gamma UCL	7392		
95% Adjusted Gamma UCL	7667		

Potential UCL to Use Use 95% Approximate Gamma UCL 7392

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

Minimum	1.59	Log-transformed Statistics	
Maximum	713	Minimum of Log Data	0.464
Mean	85.67	Maximum of Log Data	6.569
Median	48	Mean of log Data	3.467
SD	149.8	SD of log Data	1.536
Coefficient of Variation	1.748		
Skewness	3.67		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	139.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	307.4
95% Adjusted-CLT UCL (Chen-1995)	162.6	95% Chebyshev (MVUE) UCL	255.8
95% Modified-t UCL (Johnson-1978)	143.3	97.5% Chebyshev (MVUE) UCL	325.7
		99% Chebyshev (MVUE) UCL	462.9

Gamma Distribution Test

k star (bias corrected)	0.572	Data Distribution	
Theta Star	149.7	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	85.67		
MLE of Standard Deviation	113.3		
nu star	26.32	Nonparametric Statistics	
Approximate Chi Square Value (.05)	15.62	95% CLT UCL	137
Adjusted Level of Significance	0.0389	95% Jackknife UCL	139.3
Adjusted Chi Square Value	15.03	95% Standard Bootstrap UCL	136.6
Anderson-Darling Test Statistic	0.65	95% Bootstrap-t UCL	227.9
Anderson-Darling 5% Critical Value	0.794	95% Hall's Bootstrap UCL	341
Kolmogorov-Smirnov Test Statistic	0.204	95% Percentile Bootstrap UCL	137.1
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	172.7
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	221.8
		97.5% Chebyshev(Mean, Sd) UCL	280.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	396.4
95% Approximate Gamma UCL	144.3		
95% Adjusted Gamma UCL	150		

Potential UCL to Use Use 95% Approximate Gamma UCL 144.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

Minimum	0.207	Log-transformed Statistics	
Maximum	65.1	Minimum of Log Data	-1.575
Mean	13.54	Maximum of Log Data	4.176
Median	8.7	Mean of log Data	1.664
SD	17.66	SD of log Data	1.624
Coefficient of Variation	1.304		
Skewness	1.954		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.722	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	64.9
95% Adjusted-CLT UCL (Chen-1995)	21.19	95% Chebyshev (MVUE) UCL	49.61
95% Modified-t UCL (Johnson-1978)	20.11	97.5% Chebyshev (MVUE) UCL	63.48
		99% Chebyshev (MVUE) UCL	90.73

Gamma Distribution Test

k star (bias corrected)	0.593	Data Distribution	
Theta Star	22.82	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	13.54		
MLE of Standard Deviation	17.58		
nu star	27.28	Nonparametric Statistics	
Approximate Chi Square Value (.05)	16.37	95% CLT UCL	19.59
Adjusted Level of Significance	0.0389	95% Jackknife UCL	19.86
Adjusted Chi Square Value	15.76	95% Standard Bootstrap UCL	19.39
Anderson-Darling Test Statistic	0.371	95% Bootstrap-t UCL	22.83
Anderson-Darling 5% Critical Value	0.791	95% Hall's Bootstrap UCL	26.02
Kolmogorov-Smirnov Test Statistic	0.12	95% Percentile Bootstrap UCL	19.87
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	20.78
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29.58
		97.5% Chebyshev(Mean, Sd) UCL	36.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	50.17
95% Approximate Gamma UCL	22.56		
95% Adjusted Gamma UCL	23.44		

Potential UCL to Use Use 95% Approximate Gamma UCL 22.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

Minimum	14.8	Log-transformed Statistics	
Maximum	4540	Minimum of Log Data	2.695
Mean	683.1	Maximum of Log Data	8.421
Median	438	Mean of log Data	5.677
SD	974.3	SD of log Data	1.492
Coefficient of Variation	1.426		
Skewness	3.085		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.642	Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1032	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2486
95% Adjusted-CLT UCL (Chen-1995)	1157	95% Chebyshev (MVUE) UCL	2151
95% Modified-t UCL (Johnson-1978)	1054	97.5% Chebyshev (MVUE) UCL	2731
		99% Chebyshev (MVUE) UCL	3870

Gamma Distribution Test

k star (bias corrected)	0.646	Data Distribution	
Theta Star	1057	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	683.1		
MLE of Standard Deviation	849.8		
nu star	29.72		
Approximate Chi Square Value (.05)	18.28	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	1017
Adjusted Chi Square Value	17.63	95% Jackknife UCL	1032
		95% Standard Bootstrap UCL	1010
Anderson-Darling Test Statistic	0.315	95% Bootstrap-t UCL	1428
Anderson-Darling 5% Critical Value	0.786	95% Hall's Bootstrap UCL	2381
Kolmogorov-Smirnov Test Statistic	0.127	95% Percentile Bootstrap UCL	1031
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	1171
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1569
		97.5% Chebyshev(Mean, Sd) UCL	1952
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2705
95% Approximate Gamma UCL	1111		
95% Adjusted Gamma UCL	1152		

Potential UCL to Use Use 95% Approximate Gamma UCL 1111

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

		Log-transformed Statistics	
Minimum	17.7	Minimum of Log Data	2.874
Maximum	51.7	Maximum of Log Data	3.945
Mean	32.34	Mean of log Data	3.444
Median	32.34	SD of log Data	0.26
SD	8.477		
Coefficient of Variation	0.262		
Skewness	0.743		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.914	Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	35.38	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	35.79
95% Adjusted-CLT UCL (Chen-1995)	35.54	95% Chebyshev (MVUE) UCL	40.08
95% Modified-t UCL (Johnson-1978)	35.42	97.5% Chebyshev (MVUE) UCL	43.43
		99% Chebyshev (MVUE) UCL	50

Gamma Distribution Test

k star (bias corrected)	13.69	Data Distribution	
Theta Star	2.362	Data appear Normal at 5% Significance Level	
MLE of Mean	32.34		
MLE of Standard Deviation	8.741		
nu star	629.7		
Approximate Chi Square Value (.05)	572.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	35.25
Adjusted Chi Square Value	568.6	95% Jackknife UCL	35.38
		95% Standard Bootstrap UCL	35.23
Anderson-Darling Test Statistic	0.711	95% Bootstrap-t UCL	35.89
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	35.9
Kolmogorov-Smirnov Test Statistic	0.213	95% Percentile Bootstrap UCL	35.33
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	35.43
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	40.05
		97.5% Chebyshev(Mean, Sd) UCL	43.38
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	49.93
95% Approximate Gamma UCL	35.57		
95% Adjusted Gamma UCL	35.82		

Potential UCL to Use Use 95% Student's-t UCL 35.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 541-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

	Log-transformed Statistics	
Minimum	7240 Minimum of Log Data	8.887
Maximum	19200 Maximum of Log Data	9.863
Mean	13315 Mean of log Data	9.474
Median	13315 SD of log Data	0.223
SD	2719	
Coefficient of Variation	0.204	
Skewness	-0.295	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test	0.958 Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Test Statistic	0.914 Shapiro Wilk Critical Value	0.914
Shapiro Wilk Critical Value		
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	14288 95% H-UCL	14529
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	16067
95% Adjusted-CLT UCL (Chen-1995)	14210 97.5% Chebyshev (MVUE) UCL	17249
95% Modified-t UCL (Johnson-1978)	14282 99% Chebyshev (MVUE) UCL	19570

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	19.68 Data appear Normal at 5% Significance Level	
Theta Star	676.7	
MLE of Mean	13315	
MLE of Standard Deviation	3002	
nu star	905.1	
Approximate Chi Square Value (.05)	836.3 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	14247
Adjusted Chi Square Value	831.5 95% Jackknife UCL	14288
	95% Standard Bootstrap UCL	14225
Anderson-Darling Test Statistic	0.678 95% Bootstrap-t UCL	14248
Anderson-Darling 5% Critical Value	0.742 95% Hall's Bootstrap UCL	14275
Kolmogorov-Smirnov Test Statistic	0.18 95% Percentile Bootstrap UCL	14200
Kolmogorov-Smirnov 5% Critical Value	0.181 95% BCA Bootstrap UCL	14232
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	15786
	97.5% Chebyshev(Mean, Sd) UCL	16855
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18956
95% Approximate Gamma UCL	14411	
95% Adjusted Gamma UCL	14493	

Potential UCL to Use Use 95% Student's-t UCL 14288

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Americium-241

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics
Minimum	-0.0047 Log Statistics Not Available
Maximum	27.3
Mean	2.249
Median	0.0031
SD	5.812
Coefficient of Variation	2.584
Skewness	4.023

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.419 Not Available
Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.33	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	4.33	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	5.329
		95% Modified-t UCL (Johnson-1978)	4.5

Gamma Distribution Test

Gamma Statistics Not Available	Data Distribution
	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	7.532	95% CLT UCL	4.243
		95% Jackknife UCL	4.33
		95% Standard Bootstrap UCL	4.286
		95% Bootstrap-t UCL	10.76
		95% Hall's Bootstrap UCL	12.88
		95% Percentile Bootstrap UCL	4.531
		95% BCA Bootstrap UCL	5.789
		95% Chebyshev(Mean, Sd) UCL	7.532
		97.5% Chebyshev(Mean, Sd) UCL	9.817
		99% Chebyshev(Mean, Sd) UCL	14.31

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 16

Raw Statistics

	Log-transformed Statistics	
Minimum	63 Minimum of Log Data	4.143
Maximum	230 Maximum of Log Data	5.438
Mean	114.6 Mean of log Data	4.698
Median	108 SD of log Data	0.292
SD	37.36	
Coefficient of Variation	0.326	
Skewness	1.683	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.817 Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	128 95% H-UCL	128.3
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	145.1
95% Adjusted-CLT UCL (Chen-1995)	130.3 97.5% Chebyshev (MVUE) UCL	158.4
95% Modified-t UCL (Johnson-1978)	128.4 99% Chebyshev (MVUE) UCL	184.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	10.24 Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.19	
MLE of Mean	114.6	
MLE of Standard Deviation	35.82	
nu star	471	
Approximate Chi Square Value (.05)	421.7 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	127.4
Adjusted Chi Square Value	418.3 95% Jackknife UCL	128
	95% Standard Bootstrap UCL	127.1
Anderson-Darling Test Statistic	1.161 95% Bootstrap-t UCL	133.8
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	141.5
Kolmogorov-Smirnov Test Statistic	0.248 95% Percentile Bootstrap UCL	127.3
Kolmogorov-Smirnov 5% Critical Value	0.181 95% BCA Bootstrap UCL	131.2
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	148.6
	97.5% Chebyshev(Mean, Sd) UCL	163.3
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	192.1
95% Approximate Gamma UCL	128	
95% Adjusted Gamma UCL	129.1	

Potential UCL to Use

Use 95% Student's-t UCL 128
or 95% Modified-t UCL 128.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

	Log-transformed Statistics	
Minimum	0.424 Minimum of Log Data	-0.858
Maximum	1.46 Maximum of Log Data	0.378
Mean	0.608 Mean of log Data	-0.553
Median	0.577 SD of log Data	0.308
SD	0.253	
Coefficient of Variation	0.417	
Skewness	2.724	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.601 Shapiro Wilk Test Statistic	0.744
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.698 95% H-UCL	0.68
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.773
95% Adjusted-CLT UCL (Chen-1995)	0.727 97.5% Chebyshev (MVUE) UCL	0.847
95% Modified-t UCL (Johnson-1978)	0.703 99% Chebyshev (MVUE) UCL	0.992

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	8.074 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0753	
MLE of Mean	0.608	
MLE of Standard Deviation	0.214	
nu star	371.4	
Approximate Chi Square Value (.05)	327.7 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	0.695
Adjusted Chi Square Value	324.8 95% Jackknife UCL	0.698
	95% Standard Bootstrap UCL	0.692
Anderson-Darling Test Statistic	2.421 95% Bootstrap-t UCL	0.861
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	1.213
Kolmogorov-Smirnov Test Statistic	0.282 95% Percentile Bootstrap UCL	0.698
Kolmogorov-Smirnov 5% Critical Value	0.182 95% BCA Bootstrap UCL	0.723
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.838
	97.5% Chebyshev(Mean, Sd) UCL	0.938
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.133
95% Approximate Gamma UCL	0.689	
95% Adjusted Gamma UCL	0.695	

Potential UCL to Use

Use 95% Student's-t UCL 0.698
or 95% Modified-t UCL 0.703

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics	
Minimum	0.481 Minimum of Log Data	-0.732
Maximum	2.75 Maximum of Log Data	1.012
Mean	1.374 Mean of log Data	0.174
Median	1.374 SD of log Data	0.564
SD	0.714	
Coefficient of Variation	0.52	
Skewness	0.427	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.905 Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1.629 95% H-UCL	1.783
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	2.131
95% Adjusted-CLT UCL (Chen-1995)	1.633 97.5% Chebyshev (MVUE) UCL	2.453
95% Modified-t UCL (Johnson-1978)	1.631 99% Chebyshev (MVUE) UCL	3.087

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	3.209 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.428	
MLE of Mean	1.374	
MLE of Standard Deviation	0.767	
nu star	147.6	
Approximate Chi Square Value (.05)	120.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	1.618
Adjusted Chi Square Value	118.7 95% Jackknife UCL	1.629
	95% Standard Bootstrap UCL	1.611
Anderson-Darling Test Statistic	0.645 95% Bootstrap-t UCL	1.655
Anderson-Darling 5% Critical Value	0.75 95% Hall's Bootstrap UCL	1.627
Kolmogorov-Smirnov Test Statistic	0.141 95% Percentile Bootstrap UCL	1.614
Kolmogorov-Smirnov 5% Critical Value	0.183 95% BCA Bootstrap UCL	1.619
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	2.023
	97.5% Chebyshev(Mean, Sd) UCL	2.304
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2.855
95% Approximate Gamma UCL	1.682	
95% Adjusted Gamma UCL	1.707	

Potential UCL to Use Use 95% Approximate Gamma UCL 1.682

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics
Minimum	-0.0236 Log Statistics Not Available
Maximum	2.33
Mean	0.437
Median	0.251
SD	0.573
Coefficient of Variation	1.31
Skewness	2.602

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.622 Not Available
Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.642	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.642	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.703
		95% Modified-t UCL (Johnson-1978)	0.653

Gamma Distribution Test

Gamma Statistics Not Available	Data Distribution
	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.958	95% CLT UCL	0.634
		95% Jackknife UCL	0.642
		95% Standard Bootstrap UCL	0.632
		95% Bootstrap-t UCL	0.992
		95% Hall's Bootstrap UCL	1.534
		95% Percentile Bootstrap UCL	0.638
		95% BCA Bootstrap UCL	0.729
		95% Chebyshev(Mean, Sd) UCL	0.958
		97.5% Chebyshev(Mean, Sd) UCL	1.183
		99% Chebyshev(Mean, Sd) UCL	1.625

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 22

Raw Statistics

	Log-transformed Statistics	
Minimum	10.8 Minimum of Log Data	2.38
Maximum	3353 Maximum of Log Data	8.117
Mean	532.7 Mean of log Data	5.6
Median	366.5 SD of log Data	1.307
SD	712	
Coefficient of Variation	1.337	
Skewness	3.11	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.647 Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	787.6 95% H-UCL	1449
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1440
95% Adjusted-CLT UCL (Chen-1995)	879.7 97.5% Chebyshev (MVUE) UCL	1804
95% Modified-t UCL (Johnson-1978)	803.7 99% Chebyshev (MVUE) UCL	2521

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.783 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	680.4	
MLE of Mean	532.7	
MLE of Standard Deviation	602.1	
nu star	36.01	
Approximate Chi Square Value (.05)	23.28 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	776.9
Adjusted Chi Square Value	22.54 95% Jackknife UCL	787.6
	95% Standard Bootstrap UCL	767.2
Anderson-Darling Test Statistic	0.259 95% Bootstrap-t UCL	1056
Anderson-Darling 5% Critical Value	0.776 95% Hall's Bootstrap UCL	1842
Kolmogorov-Smirnov Test Statistic	0.134 95% Percentile Bootstrap UCL	799.5
Kolmogorov-Smirnov 5% Critical Value	0.188 95% BCA Bootstrap UCL	912
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1180
	97.5% Chebyshev(Mean, Sd) UCL	1460
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2010
95% Approximate Gamma UCL	824.1	
95% Adjusted Gamma UCL	851.2	

Potential UCL to Use

Use 95% Approximate Gamma UCL 824.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 6

Raw Statistics

	Log-transformed Statistics
Minimum	-0.0094 Log Statistics Not Available
Maximum	0.0183
Mean	0.0063
Median	0.0063
SD	0.0042
Coefficient of Variation	0.677
Skewness	-1.373

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.465 Not Available
Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0078	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.0078	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.00744
		95% Modified-t UCL (Johnson-1978)	0.00773

Gamma Distribution Test

Gamma Statistics Not Available	Data Distribution
	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0101	95% CLT UCL	0.00771
		95% Jackknife UCL	0.00778
		95% Standard Bootstrap UCL	0.00769
		95% Bootstrap-t UCL	0.00746
		95% Hall's Bootstrap UCL	0.00765
		95% Percentile Bootstrap UCL	0.00752
		95% BCA Bootstrap UCL	0.00736
		95% Chebyshev(Mean, Sd) UCL	0.0101
		97.5% Chebyshev(Mean, Sd) UCL	0.0118
		99% Chebyshev(Mean, Sd) UCL	0.0151

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics	
Minimum	7080 Minimum of Log Data	8.865
Maximum	29600 Maximum of Log Data	10.3
Mean	14405 Mean of log Data	9.539
Median	14400 SD of log Data	0.269
SD	4364	
Coefficient of Variation	0.303	
Skewness	2.099	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.777 Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	15967 95% H-UCL	15967
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	17932
95% Adjusted-CLT UCL (Chen-1995)	16327 97.5% Chebyshev (MVUE) UCL	19471
95% Modified-t UCL (Johnson-1978)	16034 99% Chebyshev (MVUE) UCL	22493

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	12.08 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1192	
MLE of Mean	14405	
MLE of Standard Deviation	4144	
nu star	555.7	
Approximate Chi Square Value (.05)	502.1 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	15902
Adjusted Chi Square Value	498.4 95% Jackknife UCL	15967
	95% Standard Bootstrap UCL	15846
Anderson-Darling Test Statistic	1.284 95% Bootstrap-t UCL	16795
Anderson-Darling 5% Critical Value	0.743 95% Hall's Bootstrap UCL	25359
Kolmogorov-Smirnov Test Statistic	0.247 95% Percentile Bootstrap UCL	15978
Kolmogorov-Smirnov 5% Critical Value	0.181 95% BCA Bootstrap UCL	16358
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	18371
	97.5% Chebyshev(Mean, Sd) UCL	20088
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	23459
95% Approximate Gamma UCL	15945	
95% Adjusted Gamma UCL	16063	

Potential UCL to Use

Use 95% Student's-t UCL 15967
or 95% Modified-t UCL 16034

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 15

Raw Statistics

	Log-transformed Statistics	
Minimum	0.016 Minimum of Log Data	-4.135
Maximum	0.23 Maximum of Log Data	-1.47
Mean	0.0472 Mean of log Data	-3.385
Median	0.027 SD of log Data	0.711
SD	0.0559	
Coefficient of Variation	1.184	
Skewness	2.895	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.517 Shapiro Wilk Test Statistic	0.812
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.0673 95% H-UCL	0.0607
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.0729
95% Adjusted-CLT UCL (Chen-1995)	0.0739 97.5% Chebyshev (MVUE) UCL	0.0859
95% Modified-t UCL (Johnson-1978)	0.0684 99% Chebyshev (MVUE) UCL	0.111

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	1.465 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0322	
MLE of Mean	0.0472	
MLE of Standard Deviation	0.039	
nu star	67.38	
Approximate Chi Square Value (.05)	49.49 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	0.0664
Adjusted Chi Square Value	48.38 95% Jackknife UCL	0.0673
	95% Standard Bootstrap UCL	0.0657
Anderson-Darling Test Statistic	2.356 95% Bootstrap-t UCL	0.125
Anderson-Darling 5% Critical Value	0.758 95% Hall's Bootstrap UCL	0.179
Kolmogorov-Smirnov Test Statistic	0.292 95% Percentile Bootstrap UCL	0.0675
Kolmogorov-Smirnov 5% Critical Value	0.185 95% BCA Bootstrap UCL	0.0745
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.0981
	97.5% Chebyshev(Mean, Sd) UCL	0.12
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	0.163
95% Approximate Gamma UCL	0.0643	
95% Adjusted Gamma UCL	0.0658	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.0981

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 7

Raw Statistics

	Log-transformed Statistics	
Minimum	0.46 Minimum of Log Data	-0.777
Maximum	1.8 Maximum of Log Data	0.588
Mean	0.557 Mean of log Data	-0.639
Median	0.49 SD of log Data	0.277
SD	0.273	
Coefficient of Variation	0.491	
Skewness	4.655	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.322 Shapiro Wilk Test Statistic	0.431
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	0.655 95% H-UCL	0.61
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.687
95% Adjusted-CLT UCL (Chen-1995)	0.71 97.5% Chebyshev (MVUE) UCL	0.748
95% Modified-t UCL (Johnson-1978)	0.664 99% Chebyshev (MVUE) UCL	0.866

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	8.25 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0675	
MLE of Mean	0.557	
MLE of Standard Deviation	0.194	
nu star	379.5	
Approximate Chi Square Value (.05)	335.4 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	0.651
Adjusted Chi Square Value	332.4 95% Jackknife UCL	0.655
	95% Standard Bootstrap UCL	0.646
Anderson-Darling Test Statistic	5.108 95% Bootstrap-t UCL	1.09
Anderson-Darling 5% Critical Value	0.744 95% Hall's Bootstrap UCL	1.017
Kolmogorov-Smirnov Test Statistic	0.413 95% Percentile Bootstrap UCL	0.67
Kolmogorov-Smirnov 5% Critical Value	0.182 95% BCA Bootstrap UCL	0.731
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.806
	97.5% Chebyshev(Mean, Sd) UCL	0.913
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	1.124
95% Approximate Gamma UCL	0.63	
95% Adjusted Gamma UCL	0.636	

Potential UCL to Use

Use 95% Student's-t UCL 0.655
or 95% Modified-t UCL 0.664

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics
Minimum	-0.0167 Log Statistics Not Available
Maximum	0.181
Mean	0.0169
Median	0.0043
SD	0.0422
Coefficient of Variation	2.5
Skewness	3.146

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.603 Not Available
Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.032	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.032	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.0375
		95% Modified-t UCL (Johnson-1978)	0.033

Gamma Distribution Test

Gamma Statistics Not Available	Data Distribution
	Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0552	95% CLT UCL	0.0314
		95% Jackknife UCL	0.032
		95% Standard Bootstrap UCL	0.0308
		95% Bootstrap-t UCL	0.0576
		95% Hall's Bootstrap UCL	0.106
		95% Percentile Bootstrap UCL	0.0334
		95% BCA Bootstrap UCL	0.0402
		95% Chebyshev(Mean, Sd) UCL	0.0552
		97.5% Chebyshev(Mean, Sd) UCL	0.0718
		99% Chebyshev(Mean, Sd) UCL	0.104

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

	Log-transformed Statistics	
Minimum	5.97 Minimum of Log Data	1.787
Maximum	32.8 Maximum of Log Data	3.49
Mean	13.03 Mean of log Data	2.488
Median	12.2 SD of log Data	0.387
SD	6.171	
Coefficient of Variation	0.474	
Skewness	2.217	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.738 Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	15.24 95% H-UCL	15.14
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	17.57
95% Adjusted-CLT UCL (Chen-1995)	15.78 97.5% Chebyshev (MVUE) UCL	19.58
95% Modified-t UCL (Johnson-1978)	15.34 99% Chebyshev (MVUE) UCL	23.53

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	5.625 Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.316	
MLE of Mean	13.03	
MLE of Standard Deviation	5.493	
nu star	258.8	
Approximate Chi Square Value (.05)	222.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	15.15
Adjusted Chi Square Value	220.1 95% Jackknife UCL	15.24
	95% Standard Bootstrap UCL	15.14
Anderson-Darling Test Statistic	1.167 95% Bootstrap-t UCL	17.15
Anderson-Darling 5% Critical Value	0.746 95% Hall's Bootstrap UCL	28.44
Kolmogorov-Smirnov Test Statistic	0.274 95% Percentile Bootstrap UCL	15.24
Kolmogorov-Smirnov 5% Critical Value	0.182 95% BCA Bootstrap UCL	16.09
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	18.64
	97.5% Chebyshev(Mean, Sd) UCL	21.07
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	25.83
95% Approximate Gamma UCL	15.15	
95% Adjusted Gamma UCL	15.32	

Potential UCL to Use

Use 95% Student's-t UCL 15.24
or 95% Modified-t UCL 15.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 11

Raw Statistics

	Log-transformed Statistics	
Minimum	0.1 Minimum of Log Data	-2.303
Maximum	94 Maximum of Log Data	4.543
Mean	38.38 Mean of log Data	2.926
Median	50 SD of log Data	1.927
SD	24.46	
Coefficient of Variation	0.637	
Skewness	-0.158	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.841 Shapiro Wilk Test Statistic	0.664
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	47.14 95% H-UCL	600.3
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	317.1
95% Adjusted-CLT UCL (Chen-1995)	46.59 97.5% Chebyshev (MVUE) UCL	411.7
95% Modified-t UCL (Johnson-1978)	47.11 99% Chebyshev (MVUE) UCL	597.6

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.742 Data do not follow a Discernable Distribution (0.05)	
Theta Star	51.75	
MLE of Mean	38.38	
MLE of Standard Deviation	44.57	
nu star	34.11	
Approximate Chi Square Value (.05)	21.75 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	46.77
Adjusted Chi Square Value	21.04 95% Jackknife UCL	47.14
	95% Standard Bootstrap UCL	46.53
Anderson-Darling Test Statistic	2.984 95% Bootstrap-t UCL	46.8
Anderson-Darling 5% Critical Value	0.779 95% Hall's Bootstrap UCL	46.87
Kolmogorov-Smirnov Test Statistic	0.341 95% Percentile Bootstrap UCL	46.36
Kolmogorov-Smirnov 5% Critical Value	0.188 95% BCA Bootstrap UCL	46.46
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	60.61
	97.5% Chebyshev(Mean, Sd) UCL	70.23
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	89.13
95% Approximate Gamma UCL	60.18	
95% Adjusted Gamma UCL	62.23	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 60.61

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 20

Raw Statistics

	Log-transformed Statistics	
Minimum	##### Minimum of Log Data	-7.07
Maximum	7.63 Maximum of Log Data	2.032
Mean	1.006 Mean of log Data	-2.301
Median	0.23 SD of log Data	3.083
SD	1.907	
Coefficient of Variation	1.897	
Skewness	2.789	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.565 Shapiro Wilk Test Statistic	0.869
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	1.689 95% H-UCL	564.1
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	22.9
95% Adjusted-CLT UCL (Chen-1995)	1.907 97.5% Chebyshev (MVUE) UCL	30.59
95% Modified-t UCL (Johnson-1978)	1.727 99% Chebyshev (MVUE) UCL	45.69

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.289 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.479	
MLE of Mean	1.006	
MLE of Standard Deviation	1.87	
nu star	13.3	
Approximate Chi Square Value (.05)	6.094 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	1.66
Adjusted Chi Square Value	5.742 95% Jackknife UCL	1.689
	95% Standard Bootstrap UCL	1.633
Anderson-Darling Test Statistic	0.602 95% Bootstrap-t UCL	2.878
Anderson-Darling 5% Critical Value	0.849 95% Hall's Bootstrap UCL	4.626
Kolmogorov-Smirnov Test Statistic	0.145 95% Percentile Bootstrap UCL	1.751
Kolmogorov-Smirnov 5% Critical Value	0.197 95% BCA Bootstrap UCL	1.947
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	2.739
	97.5% Chebyshev(Mean, Sd) UCL	3.489
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	4.963
95% Approximate Gamma UCL	2.195	
95% Adjusted Gamma UCL	2.329	

Potential UCL to Use

Use 95% Adjusted Gamma UCL 2.329

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 22

Raw Statistics

	Log-transformed Statistics	
Minimum	1.5 Minimum of Log Data	0.405
Maximum	20200 Maximum of Log Data	9.913
Mean	3838 Mean of log Data	7.319
Median	3126 SD of log Data	2.052
SD	4473	
Coefficient of Variation	1.166	
Skewness	2.474	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.742 Shapiro Wilk Test Statistic	0.814
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	5440 95% H-UCL	75688
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	33158
95% Adjusted-CLT UCL (Chen-1995)	5886 97.5% Chebyshev (MVUE) UCL	43260
95% Modified-t UCL (Johnson-1978)	5520 99% Chebyshev (MVUE) UCL	63103

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.597 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	6424	
MLE of Mean	3838	
MLE of Standard Deviation	4965	
nu star	27.48	
Approximate Chi Square Value (.05)	16.53 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	5372
Adjusted Chi Square Value	15.91 95% Jackknife UCL	5440
	95% Standard Bootstrap UCL	5339
Anderson-Darling Test Statistic	0.412 95% Bootstrap-t UCL	6455
Anderson-Darling 5% Critical Value	0.791 95% Hall's Bootstrap UCL	13079
Kolmogorov-Smirnov Test Statistic	0.161 95% Percentile Bootstrap UCL	5489
Kolmogorov-Smirnov 5% Critical Value	0.19 95% BCA Bootstrap UCL	5938
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	7904
	97.5% Chebyshev(Mean, Sd) UCL	9663
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	13119
95% Approximate Gamma UCL	6383	
95% Adjusted Gamma UCL	6629	

Potential UCL to Use Use 95% Approximate Gamma UCL 6383

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics	
Minimum	1.09 Minimum of Log Data	0.0862
Maximum	713 Maximum of Log Data	6.569
Mean	82.25 Mean of log Data	3.298
Median	34.2 SD of log Data	1.673
SD	150.5	
Coefficient of Variation	1.83	
Skewness	3.685	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.524 Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	136.1 95% H-UCL	385.4
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	279.6
95% Adjusted-CLT UCL (Chen-1995)	159.6 97.5% Chebyshev (MVUE) UCL	358.7
95% Modified-t UCL (Johnson-1978)	140.2 99% Chebyshev (MVUE) UCL	514.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.517 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	159	
MLE of Mean	82.25	
MLE of Standard Deviation	114.4	
nu star	23.79	
Approximate Chi Square Value (.05)	13.69 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	133.9
Adjusted Chi Square Value	13.13 95% Jackknife UCL	136.1
	95% Standard Bootstrap UCL	134.1
Anderson-Darling Test Statistic	0.538 95% Bootstrap-t UCL	240.3
Anderson-Darling 5% Critical Value	0.799 95% Hall's Bootstrap UCL	335.6
Kolmogorov-Smirnov Test Statistic	0.189 95% Percentile Bootstrap UCL	136.1
Kolmogorov-Smirnov 5% Critical Value	0.191 95% BCA Bootstrap UCL	167.5
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	219
	97.5% Chebyshev(Mean, Sd) UCL	278.2
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	394.5
95% Approximate Gamma UCL	142.9	
95% Adjusted Gamma UCL	149	

Potential UCL to Use

Use 95% Approximate Gamma UCL 142.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics	
Minimum	0.111 Minimum of Log Data	-2.198
Maximum	65.1 Maximum of Log Data	4.176
Mean	10.28 Mean of log Data	1.292
Median	4.59 SD of log Data	1.698
SD	15.39	
Coefficient of Variation	1.497	
Skewness	2.647	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.647 Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	15.79 95% H-UCL	55.8
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	39.41
95% Adjusted-CLT UCL (Chen-1995)	17.45 97.5% Chebyshev (MVUE) UCL	50.63
95% Modified-t UCL (Johnson-1978)	16.09 99% Chebyshev (MVUE) UCL	72.66

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.547 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	18.8	
MLE of Mean	10.28	
MLE of Standard Deviation	13.9	
nu star	25.16	
Approximate Chi Square Value (.05)	14.74 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	15.56
Adjusted Chi Square Value	14.16 95% Jackknife UCL	15.79
	95% Standard Bootstrap UCL	15.51
Anderson-Darling Test Statistic	0.385 95% Bootstrap-t UCL	22.01
Anderson-Darling 5% Critical Value	0.796 95% Hall's Bootstrap UCL	40.54
Kolmogorov-Smirnov Test Statistic	0.157 95% Percentile Bootstrap UCL	15.96
Kolmogorov-Smirnov 5% Critical Value	0.191 95% BCA Bootstrap UCL	18
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	24.27
	97.5% Chebyshev(Mean, Sd) UCL	30.33
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	42.22
95% Approximate Gamma UCL	17.56	
95% Adjusted Gamma UCL	18.27	

Potential UCL to Use Use 95% Approximate Gamma UCL 17.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics	
Minimum	8.93 Minimum of Log Data	2.189
Maximum	4540 Maximum of Log Data	8.421
Mean	595.9 Mean of log Data	5.418
Median	350 SD of log Data	1.62
SD	957.9	
Coefficient of Variation	1.607	
Skewness	3.478	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.577 Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	938.9 95% H-UCL	2743
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	2105
95% Adjusted-CLT UCL (Chen-1995)	1079 97.5% Chebyshev (MVUE) UCL	2693
95% Modified-t UCL (Johnson-1978)	963.1 99% Chebyshev (MVUE) UCL	3847

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.577 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1032	
MLE of Mean	595.9	
MLE of Standard Deviation	784.2	
nu star	26.56	
Approximate Chi Square Value (.05)	15.81 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	924.5
Adjusted Chi Square Value	15.21 95% Jackknife UCL	938.9
	95% Standard Bootstrap UCL	915.8
Anderson-Darling Test Statistic	0.366 95% Bootstrap-t UCL	1421
Anderson-Darling 5% Critical Value	0.793 95% Hall's Bootstrap UCL	2269
Kolmogorov-Smirnov Test Statistic	0.162 95% Percentile Bootstrap UCL	947.7
Kolmogorov-Smirnov 5% Critical Value	0.19 95% BCA Bootstrap UCL	1145
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1467
	97.5% Chebyshev(Mean, Sd) UCL	1843
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2583
95% Approximate Gamma UCL	1001	
95% Adjusted Gamma UCL	1041	

Potential UCL to Use Use 95% Approximate Gamma UCL 1001

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 23 Number of Distinct Observations 18

Raw Statistics

	Log-transformed Statistics	
Minimum	12.5 Minimum of Log Data	2.526
Maximum	49.7 Maximum of Log Data	3.906
Mean	27.62 Mean of log Data	3.281
Median	27.62 SD of log Data	0.28
SD	7.888	
Coefficient of Variation	0.286	
Skewness	1.235	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.859 Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.914 Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	30.44 95% H-UCL	30.83
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	34.74
95% Adjusted-CLT UCL (Chen-1995)	30.78 97.5% Chebyshev (MVUE) UCL	37.82
95% Modified-t UCL (Johnson-1978)	30.51 99% Chebyshev (MVUE) UCL	43.86

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	11.92 Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.317	
MLE of Mean	27.62	
MLE of Standard Deviation	7.999	
nu star	548.3	
Approximate Chi Square Value (.05)	495 Nonparametric Statistics	
Adjusted Level of Significance	0.0389 95% CLT UCL	30.32
Adjusted Chi Square Value	491.3 95% Jackknife UCL	30.44
	95% Standard Bootstrap UCL	30.29
Anderson-Darling Test Statistic	1.011 95% Bootstrap-t UCL	31.25
Anderson-Darling 5% Critical Value	0.743 95% Hall's Bootstrap UCL	33.55
Kolmogorov-Smirnov Test Statistic	0.183 95% Percentile Bootstrap UCL	30.27
Kolmogorov-Smirnov 5% Critical Value	0.181 95% BCA Bootstrap UCL	30.58
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	34.79
	97.5% Chebyshev(Mean, Sd) UCL	37.89
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	43.98
95% Approximate Gamma UCL	30.59	
95% Adjusted Gamma UCL	30.82	

Potential UCL to Use

Use 95% Student's-t UCL 30.44
or 95% Modified-t UCL 30.51

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	561-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	32	Number of Distinct Observations	19
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Raw Statistics

Minimum	7500	Log-transformed Statistics	
Maximum	17600	Minimum of Log Data	8.923
Mean	11495	Maximum of Log Data	9.776
Median	11495	Mean of log Data	9.336
SD	1998	SD of log Data	0.165
Coefficient of Variation	0.174		
Skewness	1.312		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12094	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12099
95% Adjusted-CLT UCL (Chen-1995)	12164	95% Chebyshev (MVUE) UCL	12957
95% Modified-t UCL (Johnson-1978)	12108	97.5% Chebyshev (MVUE) UCL	13591
		99% Chebyshev (MVUE) UCL	14837

Gamma Distribution Test

k star (bias corrected)	33.71	Data Distribution	
Theta Star	341	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11495		
MLE of Standard Deviation	1980		
nu star	2158		
Approximate Chi Square Value (.05)	2051	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	12076
Adjusted Chi Square Value	2045	95% Jackknife UCL	12094
		95% Standard Bootstrap UCL	12082
Anderson-Darling Test Statistic	1.928	95% Bootstrap-t UCL	12268
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	12409
Kolmogorov-Smirnov Test Statistic	0.259	95% Percentile Bootstrap UCL	12142
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	12167
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13035
		97.5% Chebyshev(Mean, Sd) UCL	13701
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15010
95% Approximate Gamma UCL	12095		
95% Adjusted Gamma UCL	12127		

Potential UCL to Use

Use 95% Student's-t UCL	12094
or 95% Modified-t UCL	12108

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	0.14	Minimum of Log Data	-1.966
Maximum	3.5	Maximum of Log Data	1.253
Mean	0.45	Mean of log Data	-1.071
Median	0.41	SD of log Data	0.625
SD	0.578		
Coefficient of Variation	1.284		
Skewness	5.033		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.397	Shapiro Wilk Test Statistic	0.841
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.623	95% H-UCL	0.523
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.626
95% Adjusted-CLT UCL (Chen-1995)	0.715	97.5% Chebyshev (MVUE) UCL	0.718
95% Modified-t UCL (Johnson-1978)	0.638	99% Chebyshev (MVUE) UCL	0.899

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.82	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.247		
MLE of Mean	0.45		
MLE of Standard Deviation	0.334		
nu star	116.5		
Approximate Chi Square Value (.05)	92.56	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.618
Adjusted Chi Square Value	91.41	95% Jackknife UCL	0.623
		95% Standard Bootstrap UCL	0.617
Anderson-Darling Test Statistic	2.551	95% Bootstrap-t UCL	0.994
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	1.33
Kolmogorov-Smirnov Test Statistic	0.312	95% Percentile Bootstrap UCL	0.648
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	0.75
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.895
		97.5% Chebyshev(Mean, Sd) UCL	1.088
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.466
95% Approximate Gamma UCL	0.566		
95% Adjusted Gamma UCL	0.573		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.895

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics	
Minimum	7.5 Minimum of Log Data	2.015
Maximum	33.1 Maximum of Log Data	3.5
Mean	14.74 Mean of log Data	2.631
Median	14.74 SD of log Data	0.352
SD	5.329	
Coefficient of Variation	0.362	
Skewness	1.239	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.866 Shapiro Wilk Test Statistic	0.907
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	16.34 95% H-UCL	16.59
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	18.84
95% Adjusted-CLT UCL (Chen-1995)	16.51 97.5% Chebyshev (MVUE) UCL	20.61
95% Modified-t UCL (Johnson-1978)	16.37 99% Chebyshev (MVUE) UCL	24.1

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.741 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.904	
MLE of Mean	14.74	
MLE of Standard Deviation	5.299	
nu star	495.4	
Approximate Chi Square Value (.05)	444.8 Nonparametric Statistics	
Adjusted Level of Significance	0.0416 95% CLT UCL	16.29
Adjusted Chi Square Value	442.2 95% Jackknife UCL	16.34
	95% Standard Bootstrap UCL	16.32
Anderson-Darling Test Statistic	1.426 95% Bootstrap-t UCL	16.62
Anderson-Darling 5% Critical Value	0.747 95% Hall's Bootstrap UCL	17.03
Kolmogorov-Smirnov Test Statistic	0.264 95% Percentile Bootstrap UCL	16.35
Kolmogorov-Smirnov 5% Critical Value	0.156 95% BCA Bootstrap UCL	16.49
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	18.85
	97.5% Chebyshev(Mean, Sd) UCL	20.63
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	24.12
95% Approximate Gamma UCL	16.42	
95% Adjusted Gamma UCL	16.51	

Potential UCL to Use

Use 95% Student's-t UCL 16.34
or 95% Modified-t UCL 16.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 15

Raw Statistics

	Log-transformed Statistics	
Minimum	82.6 Minimum of Log Data	4.414
Maximum	438 Maximum of Log Data	6.082
Mean	126 Mean of log Data	4.787
Median	123.5 SD of log Data	0.271
SD	58.78	
Coefficient of Variation	0.466	
Skewness	5.098	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.395 Shapiro Wilk Test Statistic	0.631
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	143.7 95% H-UCL	135.6
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	150.5
95% Adjusted-CLT UCL (Chen-1995)	153.1 97.5% Chebyshev (MVUE) UCL	161.9
95% Modified-t UCL (Johnson-1978)	145.2 99% Chebyshev (MVUE) UCL	184.2

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	9.257 Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.61	
MLE of Mean	126	
MLE of Standard Deviation	41.42	
nu star	592.5	
Approximate Chi Square Value (.05)	537 Nonparametric Statistics	
Adjusted Level of Significance	0.0416 95% CLT UCL	143.1
Adjusted Chi Square Value	534.2 95% Jackknife UCL	143.7
	95% Standard Bootstrap UCL	142.7
Anderson-Darling Test Statistic	4.242 95% Bootstrap-t UCL	177.6
Anderson-Darling 5% Critical Value	0.747 95% Hall's Bootstrap UCL	216.1
Kolmogorov-Smirnov Test Statistic	0.365 95% Percentile Bootstrap UCL	146.4
Kolmogorov-Smirnov 5% Critical Value	0.155 95% BCA Bootstrap UCL	156.4
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	171.3
	97.5% Chebyshev(Mean, Sd) UCL	190.9
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	229.4
95% Approximate Gamma UCL	139.1	
95% Adjusted Gamma UCL	139.8	

Potential UCL to Use

Use 95% Student's-t UCL 143.7
or 95% Modified-t UCL 145.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 18

Raw Statistics

		Log-transformed Statistics	
Minimum	0.42	Minimum of Log Data	-0.868
Maximum	1.5	Maximum of Log Data	0.405
Mean	0.619	Mean of log Data	-0.508
Median	0.619	SD of log Data	0.227
SD	0.183		
Coefficient of Variation	0.296		
Skewness	3.699		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.608	Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.674	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.663
95% Adjusted-CLT UCL (Chen-1995)	0.695	95% Chebyshev (MVUE) UCL	0.726
95% Modified-t UCL (Johnson-1978)	0.678	97.5% Chebyshev (MVUE) UCL	0.773
		99% Chebyshev (MVUE) UCL	0.866

Gamma Distribution Test

k star (bias corrected)	15.78	Data Distribution	
Theta Star	0.0393	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.619		
MLE of Standard Deviation	0.156		
nu star	1010		
Approximate Chi Square Value (.05)	937	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.673
Adjusted Chi Square Value	933.2	95% Jackknife UCL	0.674
		95% Standard Bootstrap UCL	0.672
Anderson-Darling Test Statistic	2.497	95% Bootstrap-t UCL	0.722
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.928
Kolmogorov-Smirnov Test Statistic	0.247	95% Percentile Bootstrap UCL	0.676
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	0.699
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.761
		97.5% Chebyshev(Mean, Sd) UCL	0.822
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.941
95% Approximate Gamma UCL	0.668		
95% Adjusted Gamma UCL	0.67		

Potential UCL to Use

Use 95% Student's-t UCL 0.674
or 95% Modified-t UCL 0.678

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

Minimum -0.006
 Maximum 0.391
 Mean 0.177
 Median 0.177
 SD 0.099
 Coefficient of Variation 0.56
 Skewness 0.447

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.902 Not Available

0.93

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

0.206

0.206

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.207

0.207

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.253

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

0.206

0.206

0.204

0.209

0.21

0.206

0.205

0.253

0.286

0.351

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 32

Raw Statistics

Minimum -89.55
 Maximum 432
 Mean 15.11
 Median 15.36
 SD 97.15
 Coefficient of Variation 6.427
 Skewness 2.648

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.751 Not Available

0.93

Assuming Normal Distribution

95% Student's-t UCL

44.23

Assuming Normal Distribution

95% Student's-t UCL

44.23

Assuming Lognormal Distribution

95% H-UCL

N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

51.95

95% Modified-t UCL (Johnson-1978)

45.57

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

89.97

95% CLT UCL

43.36

95% Jackknife UCL

44.23

95% Standard Bootstrap UCL

42.57

95% Bootstrap-t UCL

58.91

95% Hall's Bootstrap UCL

177.5

95% Percentile Bootstrap UCL

44.69

95% BCA Bootstrap UCL

54.74

95% Chebyshev(Mean, Sd) UCL

89.97

97.5% Chebyshev(Mean, Sd) UCL

122.4

99% Chebyshev(Mean, Sd) UCL

186

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 19

Raw Statistics

	Log-transformed Statistics	
Minimum	4.6 Minimum of Log Data	1.526
Maximum	30.9 Maximum of Log Data	3.431
Mean	9.611 Mean of log Data	2.189
Median	9.611 SD of log Data	0.355
SD	4.741	
Coefficient of Variation	0.493	
Skewness	3.309	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.626 Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	11.03 95% H-UCL	10.68
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12.14
95% Adjusted-CLT UCL (Chen-1995)	11.51 97.5% Chebyshev (MVUE) UCL	13.29
95% Modified-t UCL (Johnson-1978)	11.11 99% Chebyshev (MVUE) UCL	15.55

Gamma Distribution Test

k star (bias corrected)	6.345	Data Distribution	
Theta Star	1.515	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.611		
MLE of Standard Deviation	3.815		
nu star	406.1		
Approximate Chi Square Value (.05)	360.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	10.99
Adjusted Chi Square Value	358	95% Jackknife UCL	11.03
		95% Standard Bootstrap UCL	10.97
Anderson-Darling Test Statistic	2.392	95% Bootstrap-t UCL	12.58
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	17.16
Kolmogorov-Smirnov Test Statistic	0.325	95% Percentile Bootstrap UCL	11.07
Kolmogorov-Smirnov 5% Critical Value	0.156	95% BCA Bootstrap UCL	11.51
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.26
		97.5% Chebyshev(Mean, Sd) UCL	14.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.95
95% Approximate Gamma UCL	10.83		
95% Adjusted Gamma UCL	10.9		

Potential UCL to Use

Use 95% Student's-t UCL 11.03
or 95% Modified-t UCL 11.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 18

Raw Statistics

Minimum
 Maximum 0.297
 Mean 0.0314
 Median 0.0294
 SD 0.0498
 Coefficient of Variation 1.588
 Skewness 5.172

Log-transformed Statistics

0 Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.368 Not Available

0.93

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

Assuming Lognormal Distribution

0.0463 95% H-UCL

95% UCLs (Adjusted for Skewness)

0.0463 95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.0545

0.0476

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.0698

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

0.0459

0.0463

0.0458

0.0762

0.108

0.0484

0.0573

0.0698

0.0864

0.119

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 19

Raw Statistics

		Log-transformed Statistics	
Minimum	12500	Minimum of Log Data	9.433
Maximum	48500	Maximum of Log Data	10.79
Mean	18926	Mean of log Data	9.817
Median	18926	SD of log Data	0.232
SD	6038		
Coefficient of Variation	0.319		
Skewness	3.995		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.565	Shapiro Wilk Test Statistic	0.76
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	20736	95% H-UCL	20275
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22229
95% Adjusted-CLT UCL (Chen-1995)	21487	97.5% Chebyshev (MVUE) UCL	23702
95% Modified-t UCL (Johnson-1978)	20862	99% Chebyshev (MVUE) UCL	26596

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	14.53	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1303		
MLE of Mean	18926		
MLE of Standard Deviation	4966		
nu star	929.8		
Approximate Chi Square Value (.05)	860	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	20682
Adjusted Chi Square Value	856.4	95% Jackknife UCL	20736
		95% Standard Bootstrap UCL	20663
Anderson-Darling Test Statistic	2.966	95% Bootstrap-t UCL	22517
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	29106
Kolmogorov-Smirnov Test Statistic	0.311	95% Percentile Bootstrap UCL	20895
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	21523
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23579
		97.5% Chebyshev(Mean, Sd) UCL	25592
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	29546
95% Approximate Gamma UCL	20462		
95% Adjusted Gamma UCL	20547		

Potential UCL to Use

Use 95% Student's-t UCL 20736
or 95% Modified-t UCL 20862

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

		Log-transformed Statistics	
Minimum	364	Minimum of Log Data	5.897
Maximum	5230	Maximum of Log Data	8.562
Mean	1117	Mean of log Data	6.841
Median	1117	SD of log Data	0.554
SD	896.3		
Coefficient of Variation	0.802		
Skewness	3.452		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1386	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1327
95% Adjusted-CLT UCL (Chen-1995)	1481	95% Chebyshev (MVUE) UCL	1572
95% Modified-t UCL (Johnson-1978)	1402	97.5% Chebyshev (MVUE) UCL	1783
		99% Chebyshev (MVUE) UCL	2198

Gamma Distribution Test

k star (bias corrected)	2.711	Data Distribution	
Theta Star	412.2	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1117		
MLE of Standard Deviation	678.6		
nu star	173.5		
Approximate Chi Square Value (.05)	144	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	1378
Adjusted Chi Square Value	142.6	95% Jackknife UCL	1386
		95% Standard Bootstrap UCL	1377
Anderson-Darling Test Statistic	1.757	95% Bootstrap-t UCL	1649
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	2567
Kolmogorov-Smirnov Test Statistic	0.267	95% Percentile Bootstrap UCL	1409
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	1517
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1808
		97.5% Chebyshev(Mean, Sd) UCL	2107
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2694
95% Approximate Gamma UCL	1346		
95% Adjusted Gamma UCL	1359		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1808

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

Minimum -0.0056
 Maximum 0.139
 Mean 0.00719
 Median 0.00627
 SD 0.0245
 Coefficient of Variation 3.409
 Skewness 5.32

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.332 Not Available

0.93

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.0187

0.0152

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.0261

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

0.0143

0.0145

0.014

0.0333

0.0446

0.0158

0.0203

0.0261

0.0343

0.0503

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics	
Minimum	8.3 Minimum of Log Data	2.116
Maximum	22.8 Maximum of Log Data	3.127
Mean	14.01 Mean of log Data	2.618
Median	14.01 SD of log Data	0.208
SD	3.071	
Coefficient of Variation	0.219	
Skewness	1.226	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.814 Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	14.93 95% H-UCL	14.96
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	16.27
95% Adjusted-CLT UCL (Chen-1995)	15.03 97.5% Chebyshev (MVUE) UCL	17.24
95% Modified-t UCL (Johnson-1978)	14.95 99% Chebyshev (MVUE) UCL	19.17

Gamma Distribution Test

k star (bias corrected)	21.29	Data Distribution	
Theta Star	0.658	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	14.01		
MLE of Standard Deviation	3.037		
nu star	1362		
Approximate Chi Square Value (.05)	1278	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	14.9
Adjusted Chi Square Value	1273	95% Jackknife UCL	14.93
		95% Standard Bootstrap UCL	14.88
Anderson-Darling Test Statistic	2.414	95% Bootstrap-t UCL	15.06
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	15.27
Kolmogorov-Smirnov Test Statistic	0.295	95% Percentile Bootstrap UCL	14.91
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.38
		97.5% Chebyshev(Mean, Sd) UCL	17.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.41
95% Approximate Gamma UCL	14.94		
95% Adjusted Gamma UCL	14.99		

Potential UCL to Use

Use 95% Student's-t UCL 14.93
or 95% Modified-t UCL 14.95

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	0.04	Minimum of Log Data	-3.219
Maximum	2.2	Maximum of Log Data	0.788
Mean	0.636	Mean of log Data	-0.875
Median	0.43	SD of log Data	1.118
SD	0.482		
Coefficient of Variation	0.757		
Skewness	0.981		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.849	Shapiro Wilk Test Statistic	0.838
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.781	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.305
95% Adjusted-CLT UCL (Chen-1995)	0.792	95% Chebyshev (MVUE) UCL	1.523
95% Modified-t UCL (Johnson-1978)	0.783	97.5% Chebyshev (MVUE) UCL	1.856
		99% Chebyshev (MVUE) UCL	2.509

Gamma Distribution Test

k star (bias corrected)	1.219	Data Distribution	
Theta Star	0.522	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.636		
MLE of Standard Deviation	0.576		
nu star	78.02		
Approximate Chi Square Value (.05)	58.67	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.777
Adjusted Chi Square Value	57.77	95% Jackknife UCL	0.781
		95% Standard Bootstrap UCL	0.775
Anderson-Darling Test Statistic	1.51	95% Bootstrap-t UCL	0.797
Anderson-Darling 5% Critical Value	0.768	95% Hall's Bootstrap UCL	0.811
Kolmogorov-Smirnov Test Statistic	0.238	95% Percentile Bootstrap UCL	0.782
Kolmogorov-Smirnov 5% Critical Value	0.159	95% BCA Bootstrap UCL	0.802
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.008
		97.5% Chebyshev(Mean, Sd) UCL	1.168
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.484
95% Approximate Gamma UCL	0.846		
95% Adjusted Gamma UCL	0.86		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.008

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	0.14	Minimum of Log Data	-1.966
Maximum	0.52	Maximum of Log Data	-0.654
Mean	0.299	Mean of log Data	-1.254
Median	0.299	SD of log Data	0.311
SD	0.0949		
Coefficient of Variation	0.317		
Skewness	0.932		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.327	95% H-UCL	0.331
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.372
95% Adjusted-CLT UCL (Chen-1995)	0.329	97.5% Chebyshev (MVUE) UCL	0.404
95% Modified-t UCL (Johnson-1978)	0.328	99% Chebyshev (MVUE) UCL	0.466

Gamma Distribution Test

k star (bias corrected)	9.855	Data Distribution	
Theta Star	0.0303	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.299		
MLE of Standard Deviation	0.0952		
nu star	630.7		
Approximate Chi Square Value (.05)	573.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.327
Adjusted Chi Square Value	570.5	95% Jackknife UCL	0.327
		95% Standard Bootstrap UCL	0.326
Anderson-Darling Test Statistic	1.894	95% Bootstrap-t UCL	0.33
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.332
Kolmogorov-Smirnov Test Statistic	0.268	95% Percentile Bootstrap UCL	0.326
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	0.329
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.372
		97.5% Chebyshev(Mean, Sd) UCL	0.404
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.466
95% Approximate Gamma UCL	0.329		
95% Adjusted Gamma UCL	0.33		

Potential UCL to Use

Use 95% Student's-t UCL	0.327
or 95% Modified-t UCL	0.328

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	0.00384	Minimum of Log Data	-5.562
Maximum	2.626	Maximum of Log Data	0.965
Mean	0.463	Mean of log Data	-1.032
Median	0.425	SD of log Data	0.968
SD	0.41		
Coefficient of Variation	0.885		
Skewness	4.959		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.371	Shapiro Wilk Test Statistic	0.497
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.586	95% H-UCL	0.862
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.033
95% Adjusted-CLT UCL (Chen-1995)	0.65	97.5% Chebyshev (MVUE) UCL	1.239
95% Modified-t UCL (Johnson-1978)	0.597	99% Chebyshev (MVUE) UCL	1.643

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.883	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.246		
MLE of Mean	0.463		
MLE of Standard Deviation	0.338		
nu star	120.5		
Approximate Chi Square Value (.05)	96.19	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.582
Adjusted Chi Square Value	95.02	95% Jackknife UCL	0.586
		95% Standard Bootstrap UCL	0.578
Anderson-Darling Test Statistic	6.017	95% Bootstrap-t UCL	0.773
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	1.146
Kolmogorov-Smirnov Test Statistic	0.378	95% Percentile Bootstrap UCL	0.602
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	0.671
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.779
		97.5% Chebyshev(Mean, Sd) UCL	0.916
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.184
95% Approximate Gamma UCL	0.581		
95% Adjusted Gamma UCL	0.588		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.779

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 30

Raw Statistics

	Log-transformed Statistics
Minimum	-14.96 Log Statistics Not Available
Maximum	1370
Mean	68.55
Median	1.9
SD	254.3
Coefficient of Variation	3.709
Skewness	4.712

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.325 Not Available
Shapiro Wilk Critical Value	0.93

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	144.8	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	144.8	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	182.5
		95% Modified-t UCL (Johnson-1978)	151

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution
Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	264.5	95% CLT UCL	142.5
		95% Jackknife UCL	144.8
		95% Standard Bootstrap UCL	140.9
		95% Bootstrap-t UCL	329.4
		95% Hall's Bootstrap UCL	356
		95% Percentile Bootstrap UCL	153.9
		95% BCA Bootstrap UCL	202.1
		95% Chebyshev(Mean, Sd) UCL	264.5
		97.5% Chebyshev(Mean, Sd) UCL	349.3
		99% Chebyshev(Mean, Sd) UCL	515.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

		Log-transformed Statistics	
Minimum	0.128	Minimum of Log Data	-2.056
Maximum	37.78	Maximum of Log Data	3.632
Mean	3.19	Mean of log Data	0.14
Median	1.095	SD of log Data	1.42
SD	6.86		
Coefficient of Variation	2.15		
Skewness	4.54		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.41	Shapiro Wilk Test Statistic	0.899
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.246	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.733
95% Adjusted-CLT UCL (Chen-1995)	6.225	95% Chebyshev (MVUE) UCL	7.048
95% Modified-t UCL (Johnson-1978)	5.409	97.5% Chebyshev (MVUE) UCL	8.812
		99% Chebyshev (MVUE) UCL	12.28

Gamma Distribution Test

k star (bias corrected)	0.569	Data Distribution	
Theta Star	5.607	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.19		
MLE of Standard Deviation	4.229		
nu star	36.42		
Approximate Chi Square Value (.05)	23.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	5.185
Adjusted Chi Square Value	23.05	95% Jackknife UCL	5.246
		95% Standard Bootstrap UCL	5.143
Anderson-Darling Test Statistic	1.99	95% Bootstrap-t UCL	11.19
Anderson-Darling 5% Critical Value	0.801	95% Hall's Bootstrap UCL	14.78
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	5.258
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	6.744
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.476
		97.5% Chebyshev(Mean, Sd) UCL	10.76
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.26
95% Approximate Gamma UCL	4.922		
95% Adjusted Gamma UCL	5.04		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 8.476

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

		Log-transformed Statistics	
Minimum	0.00686	Minimum of Log Data	-4.982
Maximum	6.788	Maximum of Log Data	1.915
Mean	0.493	Mean of log Data	-2.155
Median	0.0855	SD of log Data	1.781
SD	1.213		
Coefficient of Variation	2.461		
Skewness	4.848		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.377	Shapiro Wilk Test Statistic	0.867
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.856	95% H-UCL	1.734
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.424
95% Adjusted-CLT UCL (Chen-1995)	1.042	97.5% Chebyshev (MVUE) UCL	1.822
95% Modified-t UCL (Johnson-1978)	0.887	99% Chebyshev (MVUE) UCL	2.604

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.426	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.158		
MLE of Mean	0.493		
MLE of Standard Deviation	0.755		
nu star	27.23		
Approximate Chi Square Value (.05)	16.33	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.846
Adjusted Chi Square Value	15.88	95% Jackknife UCL	0.856
		95% Standard Bootstrap UCL	0.849
Anderson-Darling Test Statistic	2.365	95% Bootstrap-t UCL	1.93
Anderson-Darling 5% Critical Value	0.822	95% Hall's Bootstrap UCL	2.434
Kolmogorov-Smirnov Test Statistic	0.245	95% Percentile Bootstrap UCL	0.878
Kolmogorov-Smirnov 5% Critical Value	0.166	95% BCA Bootstrap UCL	1.143
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.427
		97.5% Chebyshev(Mean, Sd) UCL	1.832
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.626
95% Approximate Gamma UCL	0.822		
95% Adjusted Gamma UCL	0.845		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1.427

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

	Log-transformed Statistics	
Minimum	0.155 Minimum of Log Data	-1.864
Maximum	412.7 Maximum of Log Data	6.023
Mean	29.71 Mean of log Data	1.404
Median	5.895 SD of log Data	2.365
SD	74.28	
Coefficient of Variation	2.5	
Skewness	4.772	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.383 Shapiro Wilk Test Statistic	0.858
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	51.97 95% H-UCL	432
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	179.6
95% Adjusted-CLT UCL (Chen-1995)	63.15 97.5% Chebyshev (MVUE) UCL	235.3
95% Modified-t UCL (Johnson-1978)	53.82 99% Chebyshev (MVUE) UCL	344.8

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.329 Data do not follow a Discernable Distribution (0.05)	
Theta Star	90.34	
MLE of Mean	29.71	
MLE of Standard Deviation	51.81	
nu star	21.05	
Approximate Chi Square Value (.05)	11.63 Nonparametric Statistics	
Adjusted Level of Significance	0.0416 95% CLT UCL	51.31
Adjusted Chi Square Value	11.25 95% Jackknife UCL	51.97
	95% Standard Bootstrap UCL	51.65
Anderson-Darling Test Statistic	2.056 95% Bootstrap-t UCL	117.7
Anderson-Darling 5% Critical Value	0.846 95% Hall's Bootstrap UCL	149.9
Kolmogorov-Smirnov Test Statistic	0.222 95% Percentile Bootstrap UCL	52.28
Kolmogorov-Smirnov 5% Critical Value	0.168 95% BCA Bootstrap UCL	70.06
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	86.95
	97.5% Chebyshev(Mean, Sd) UCL	111.7
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	160.4
95% Approximate Gamma UCL	53.78	
95% Adjusted Gamma UCL	55.57	

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 111.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 20

Raw Statistics

	Log-transformed Statistics	
Minimum	23.2 Minimum of Log Data	3.144
Maximum	86.9 Maximum of Log Data	4.465
Mean	36.01 Mean of log Data	3.55
Median	36.01 SD of log Data	0.245
SD	11.31	
Coefficient of Variation	0.314	
Skewness	3.221	

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.632 Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	39.39 95% H-UCL	38.78
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	42.7
95% Adjusted-CLT UCL (Chen-1995)	40.51 97.5% Chebyshev (MVUE) UCL	45.66
95% Modified-t UCL (Johnson-1978)	39.58 99% Chebyshev (MVUE) UCL	51.49

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	13.65 Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.638	
MLE of Mean	36.01	
MLE of Standard Deviation	9.746	
nu star	873.5	
Approximate Chi Square Value (.05)	805.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0416 95% CLT UCL	39.29
Adjusted Chi Square Value	802.5 95% Jackknife UCL	39.39
	95% Standard Bootstrap UCL	39.27
Anderson-Darling Test Statistic	2.991 95% Bootstrap-t UCL	42.58
Anderson-Darling 5% Critical Value	0.746 95% Hall's Bootstrap UCL	55.8
Kolmogorov-Smirnov Test Statistic	0.341 95% Percentile Bootstrap UCL	39.4
Kolmogorov-Smirnov 5% Critical Value	0.155 95% BCA Bootstrap UCL	41.05
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	44.72
	97.5% Chebyshev(Mean, Sd) UCL	48.49
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	55.89
95% Approximate Gamma UCL	39.03	
95% Adjusted Gamma UCL	39.19	

Potential UCL to Use

Use 95% Student's-t UCL 39.39
or 95% Modified-t UCL 39.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	561-02.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	31	Number of Distinct Observations	16
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Raw Statistics

Minimum	6360	Log-transformed Statistics	
Maximum	12500	Minimum of Log Data	8.758
Mean	8481	Maximum of Log Data	9.433
Median	8481	Mean of log Data	9.036
SD	1255	SD of log Data	0.136
Coefficient of Variation	0.148		
Skewness	1.838		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.711	Shapiro Wilk Test Statistic	0.771
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8863	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8850
95% Adjusted-CLT UCL (Chen-1995)	8931	95% Chebyshev (MVUE) UCL	9386
95% Modified-t UCL (Johnson-1978)	8876	97.5% Chebyshev (MVUE) UCL	9779
		99% Chebyshev (MVUE) UCL	10551

Gamma Distribution Test

k star (bias corrected)	47.96	Data Distribution	
Theta Star	176.8	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8481		
MLE of Standard Deviation	1225		
nu star	2973		
Approximate Chi Square Value (.05)	2848	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	8852
Adjusted Chi Square Value	2841	95% Jackknife UCL	8863
		95% Standard Bootstrap UCL	8839
Anderson-Darling Test Statistic	3.445	95% Bootstrap-t UCL	9050
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	9819
Kolmogorov-Smirnov Test Statistic	0.307	95% Percentile Bootstrap UCL	8856
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	8955
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9464
		97.5% Chebyshev(Mean, Sd) UCL	9889
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10724
95% Approximate Gamma UCL	8855		
95% Adjusted Gamma UCL	8876		

Potential UCL to Use

Use 95% Student's-t UCL	8863
or 95% Modified-t UCL	8876

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	22	Maximum of Log Data	3.091
Mean	2.072	Mean of log Data	-0.102
Median	2.072	SD of log Data	1.367
SD	3.852		
Coefficient of Variation	1.859		
Skewness	4.891		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.401	Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.246	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4.735
95% Adjusted-CLT UCL (Chen-1995)	3.859	95% Chebyshev (MVUE) UCL	5.065
95% Modified-t UCL (Johnson-1978)	3.347	97.5% Chebyshev (MVUE) UCL	6.314
		99% Chebyshev (MVUE) UCL	8.768

Gamma Distribution Test

k star (bias corrected)	0.675	Data Distribution	
Theta Star	3.067	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.072		
MLE of Standard Deviation	2.521		
nu star	41.88		
Approximate Chi Square Value (.05)	28.05	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	3.21
Adjusted Chi Square Value	27.42	95% Jackknife UCL	3.246
		95% Standard Bootstrap UCL	3.183
Anderson-Darling Test Statistic	2.451	95% Bootstrap-t UCL	5.414
Anderson-Darling 5% Critical Value	0.79	95% Hall's Bootstrap UCL	7.952
Kolmogorov-Smirnov Test Statistic	0.249	95% Percentile Bootstrap UCL	3.391
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL	4.023
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.088
		97.5% Chebyshev(Mean, Sd) UCL	6.392
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.956
95% Approximate Gamma UCL	3.094		
95% Adjusted Gamma UCL	3.165		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 5.088

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	4.6	Minimum of Log Data	1.526
Maximum	39.6	Maximum of Log Data	3.679
Mean	10.75	Mean of log Data	2.272
Median	10.75	SD of log Data	0.427
SD	6.322		
Coefficient of Variation	0.588		
Skewness	3.457		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.601	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.68	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.3
95% Adjusted-CLT UCL (Chen-1995)	13.37	95% Chebyshev (MVUE) UCL	14.25
95% Modified-t UCL (Johnson-1978)	12.79	97.5% Chebyshev (MVUE) UCL	15.84
		99% Chebyshev (MVUE) UCL	18.95

Gamma Distribution Test

k star (bias corrected)	4.552	Data Distribution	
Theta Star	2.362	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.75		
MLE of Standard Deviation	5.039		
nu star	282.2		
Approximate Chi Square Value (.05)	244.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	12.62
Adjusted Chi Square Value	242.4	95% Jackknife UCL	12.68
		95% Standard Bootstrap UCL	12.55
Anderson-Darling Test Statistic	2.502	95% Bootstrap-t UCL	14.6
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	22.32
Kolmogorov-Smirnov Test Statistic	0.307	95% Percentile Bootstrap UCL	12.65
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	13.53
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.7
		97.5% Chebyshev(Mean, Sd) UCL	17.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	22.05
95% Approximate Gamma UCL	12.42		
95% Adjusted Gamma UCL	12.52		

Potential UCL to Use

Use 95% Student's-t UCL	12.68
or 95% Modified-t UCL	12.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data	-1.139
Maximum	1	Maximum of Log Data	0
Mean	0.577	Mean of log Data	-0.579
Median	0.577	SD of log Data	0.245
SD	0.143		
Coefficient of Variation	0.248		
Skewness	0.865		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.879	Shapiro Wilk Test Statistic	0.907
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.621	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.625
95% Adjusted-CLT UCL (Chen-1995)	0.623	95% Chebyshev (MVUE) UCL	0.689
95% Modified-t UCL (Johnson-1978)	0.621	97.5% Chebyshev (MVUE) UCL	0.737
		99% Chebyshev (MVUE) UCL	0.832

Gamma Distribution Test

k star (bias corrected)	15.78	Data Distribution	
Theta Star	0.0366	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.577		
MLE of Standard Deviation	0.145		
nu star	978.1		
Approximate Chi Square Value (.05)	906.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.619
Adjusted Chi Square Value	902.7	95% Jackknife UCL	0.621
		95% Standard Bootstrap UCL	0.619
Anderson-Darling Test Statistic	1.748	95% Bootstrap-t UCL	0.627
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.632
Kolmogorov-Smirnov Test Statistic	0.274	95% Percentile Bootstrap UCL	0.619
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	0.624
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.689
		97.5% Chebyshev(Mean, Sd) UCL	0.738
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.833
95% Approximate Gamma UCL	0.622		
95% Adjusted Gamma UCL	0.625		

Potential UCL to Use

Use 95% Student's-t UCL	0.621
or 95% Modified-t UCL	0.621

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	0.039	Minimum of Log Data	-3.244
Maximum	1.2	Maximum of Log Data	0.182
Mean	0.231	Mean of log Data	-1.713
Median	0.231	SD of log Data	0.706
SD	0.209		
Coefficient of Variation	0.907		
Skewness	3.63		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.564	Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.295	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.303
95% Adjusted-CLT UCL (Chen-1995)	0.319	95% Chebyshev (MVUE) UCL	0.366
95% Modified-t UCL (Johnson-1978)	0.299	97.5% Chebyshev (MVUE) UCL	0.425
		99% Chebyshev (MVUE) UCL	0.542

Gamma Distribution Test

k star (bias corrected)	1.984	Data Distribution	
Theta Star	0.116	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.231		
MLE of Standard Deviation	0.164		
nu star	123		
Approximate Chi Square Value (.05)	98.42	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.293
Adjusted Chi Square Value	97.2	95% Jackknife UCL	0.295
		95% Standard Bootstrap UCL	0.29
Anderson-Darling Test Statistic	2.56	95% Bootstrap-t UCL	0.371
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	0.621
Kolmogorov-Smirnov Test Statistic	0.313	95% Percentile Bootstrap UCL	0.296
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	0.327
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.395
		97.5% Chebyshev(Mean, Sd) UCL	0.466
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.605
95% Approximate Gamma UCL	0.289		
95% Adjusted Gamma UCL	0.292		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.395

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

Minimum -0.0032
 Maximum 1.01
 Mean 0.268
 Median 0.268
 SD 0.171
 Coefficient of Variation 0.638
 Skewness 2.805

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.689 Not Available

0.929

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

Assuming Lognormal Distribution

0.32 95% H-UCL

95% UCLs (Adjusted for Skewness)

0.32 95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.335

0.323

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.402	95% CLT UCL	0.319
	95% Jackknife UCL	0.32
	95% Standard Bootstrap UCL	0.318
	95% Bootstrap-t UCL	0.353
	95% Hall's Bootstrap UCL	0.591
	95% Percentile Bootstrap UCL	0.321
	95% BCA Bootstrap UCL	0.338
	95% Chebyshev(Mean, Sd) UCL	0.402
	97.5% Chebyshev(Mean, Sd) UCL	0.46
	99% Chebyshev(Mean, Sd) UCL	0.574

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 28

Raw Statistics

Minimum -93.66
 Maximum 1370
 Mean 93.14
 Median 22.8
 SD 272.9
 Coefficient of Variation 2.93
 Skewness 3.717

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.595 Not Available

0.929

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

176.3

176.3

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

208.7

181.8

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

306.8

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

173.8

176.3

173.9

271.7

543.8

178.3

213.8

306.8

399.2

580.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	4.5	Minimum of Log Data	1.504
Maximum	31	Maximum of Log Data	3.434
Mean	9.431	Mean of log Data	2.165
Median	9.431	SD of log Data	0.372
SD	4.82		
Coefficient of Variation	0.511		
Skewness	3.399		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.808
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.58
95% Adjusted-CLT UCL (Chen-1995)	11.42	95% Chebyshev (MVUE) UCL	12.1
95% Modified-t UCL (Johnson-1978)	10.99	97.5% Chebyshev (MVUE) UCL	13.3
		99% Chebyshev (MVUE) UCL	15.66

Gamma Distribution Test

k star (bias corrected)	5.895	Data Distribution	
Theta Star	1.6	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.431		
MLE of Standard Deviation	3.884		
nu star	365.5		
Approximate Chi Square Value (.05)	322.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	10.86
Adjusted Chi Square Value	319.9	95% Jackknife UCL	10.9
		95% Standard Bootstrap UCL	10.82
Anderson-Darling Test Statistic	2.905	95% Bootstrap-t UCL	12.55
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	18.9
Kolmogorov-Smirnov Test Statistic	0.351	95% Percentile Bootstrap UCL	10.89
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	11.63
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.2
		97.5% Chebyshev(Mean, Sd) UCL	14.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.05
95% Approximate Gamma UCL	10.7		
95% Adjusted Gamma UCL	10.77		

Potential UCL to Use

Use 95% Student's-t UCL	10.9
or 95% Modified-t UCL	10.99

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics
Minimum	-0.0175 Log Statistics Not Available
Maximum	0.0468
Mean	0.0203
Median	0.0203
SD	0.0127
Coefficient of Variation	0.627
Skewness	-1.072

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.797 Not Available
Shapiro Wilk Critical Value	0.929

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0241	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	0.0241	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.0235
		95% Modified-t UCL (Johnson-1978)	0.0241

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0302	95% CLT UCL	0.024
		95% Jackknife UCL	0.0241
		95% Standard Bootstrap UCL	0.024
		95% Bootstrap-t UCL	0.0238
		95% Hall's Bootstrap UCL	0.0236
		95% Percentile Bootstrap UCL	0.0239
		95% BCA Bootstrap UCL	0.0234
		95% Chebyshev(Mean, Sd) UCL	0.0302
		97.5% Chebyshev(Mean, Sd) UCL	0.0345
		99% Chebyshev(Mean, Sd) UCL	0.043

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	280	Minimum of Log Data	5.635
Maximum	2230	Maximum of Log Data	7.71
Mean	950.7	Mean of log Data	6.781
Median	950.7	SD of log Data	0.412
SD	373.8		
Coefficient of Variation	0.393		
Skewness	1.307		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.822	Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1065	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1103
95% Adjusted-CLT UCL (Chen-1995)	1078	95% Chebyshev (MVUE) UCL	1274
95% Modified-t UCL (Johnson-1978)	1067	97.5% Chebyshev (MVUE) UCL	1411
		99% Chebyshev (MVUE) UCL	1681

Gamma Distribution Test

k star (bias corrected)	6.124	Data Distribution	
Theta Star	155.3	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	950.7		
MLE of Standard Deviation	384.2		
nu star	379.7		
Approximate Chi Square Value (.05)	335.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	1061
Adjusted Chi Square Value	333.2	95% Jackknife UCL	1065
		95% Standard Bootstrap UCL	1056
Anderson-Darling Test Statistic	2.336	95% Bootstrap-t UCL	1088
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	1130
Kolmogorov-Smirnov Test Statistic	0.293	95% Percentile Bootstrap UCL	1063
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	1066
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1243
		97.5% Chebyshev(Mean, Sd) UCL	1370
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1619
95% Approximate Gamma UCL	1076		
95% Adjusted Gamma UCL	1083		

Potential UCL to Use

Use 95% Student's-t UCL 1065
or 95% Modified-t UCL 1067

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

Minimum -0.005
 Maximum 0.19
 Mean 0.0207
 Median 0.0207
 SD 0.0344
 Coefficient of Variation 1.667
 Skewness 4.24

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.502
 Shapiro Wilk Critical Value 0.929
 Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 0.0312

Assuming Normal Distribution

95% Student's-t UCL 0.0312

Assuming Lognormal Distribution

95% H-UCL N/A
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen 1995) 0.0359
 95% Modified-t UCL (Johnson-1978) 0.0319

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.0476

95% CLT UCL 0.0308
 95% Jackknife UCL 0.0312
 95% Standard Bootstrap UCL 0.0307
 95% Bootstrap-t UCL 0.0464
 95% Hall's Bootstrap UCL 0.0799
 95% Percentile Bootstrap UCL 0.032
 95% BCA Bootstrap UCL 0.038
 95% Chebyshev(Mean, Sd) UCL 0.0476
 97.5% Chebyshev(Mean, Sd) UCL 0.0593
 99% Chebyshev(Mean, Sd) UCL 0.0822

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	0.04	Minimum of Log Data	-3.219
Maximum	79	Maximum of Log Data	4.369
Mean	5.334	Mean of log Data	0.119
Median	1	SD of log Data	1.837
SD	14.5		
Coefficient of Variation	2.718		
Skewness	4.735		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.373	Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.752	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	20.11
95% Adjusted-CLT UCL (Chen-1995)	11.98	95% Chebyshev (MVUE) UCL	15.57
95% Modified-t UCL (Johnson-1978)	10.12	97.5% Chebyshev (MVUE) UCL	19.99
		99% Chebyshev (MVUE) UCL	28.68

Gamma Distribution Test

k star (bias corrected)	0.401	Data Distribution	
Theta Star	13.31	Data appear Lognormal at 5% Significance Level	
MLE of Mean	5.334		
MLE of Standard Deviation	8.426		
nu star	24.85		
Approximate Chi Square Value (.05)	14.49	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	9.616
Adjusted Chi Square Value	14.05	95% Jackknife UCL	9.752
		95% Standard Bootstrap UCL	9.559
Anderson-Darling Test Statistic	1.833	95% Bootstrap-t UCL	25.58
Anderson-Darling 5% Critical Value	0.828	95% Hall's Bootstrap UCL	24.47
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	10.18
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL	14.16
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.68
		97.5% Chebyshev(Mean, Sd) UCL	21.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	31.24
95% Approximate Gamma UCL	9.143		
95% Adjusted Gamma UCL	9.43		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 16.68

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	1.2	Maximum of Log Data	0.182
Mean	0.32	Mean of log Data	-1.265
Median	0.32	SD of log Data	0.47
SD	0.206		
Coefficient of Variation	0.645		
Skewness	3.055		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.63	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.383	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.371
95% Adjusted-CLT UCL (Chen-1995)	0.403	95% Chebyshev (MVUE) UCL	0.434
95% Modified-t UCL (Johnson-1978)	0.386	97.5% Chebyshev (MVUE) UCL	0.486
		99% Chebyshev (MVUE) UCL	0.588

Gamma Distribution Test

k star (bias corrected)	3.765	Data Distribution	
Theta Star	0.085	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.32		
MLE of Standard Deviation	0.165		
nu star	233.5		
Approximate Chi Square Value (.05)	199.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.381
Adjusted Chi Square Value	197.3	95% Jackknife UCL	0.383
		95% Standard Bootstrap UCL	0.38
Anderson-Darling Test Statistic	2.304	95% Bootstrap-t UCL	0.436
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	0.664
Kolmogorov-Smirnov Test Statistic	0.338	95% Percentile Bootstrap UCL	0.384
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	0.407
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.481
		97.5% Chebyshev(Mean, Sd) UCL	0.551
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.689
95% Approximate Gamma UCL	0.375		
95% Adjusted Gamma UCL	0.379		

Potential UCL to Use

Use 95% Student's-t UCL	0.383
or 95% Modified-t UCL	0.386

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 13

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0656	Minimum of Log Data	-2.724
Maximum	9.829	Maximum of Log Data	2.285
Mean	0.982	Mean of log Data	-0.52
Median	0.982	SD of log Data	0.978
SD	1.679		
Coefficient of Variation	1.709		
Skewness	5.176		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.35	Shapiro Wilk Test Statistic	0.825
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.494	95% H-UCL	1.471
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.761
95% Adjusted-CLT UCL (Chen-1995)	1.778	97.5% Chebyshev (MVUE) UCL	2.116
95% Modified-t UCL (Johnson-1978)	1.541	99% Chebyshev (MVUE) UCL	2.816

Gamma Distribution Test

k star (bias corrected)	1.045	Data Distribution	
Theta Star	0.94	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.982		
MLE of Standard Deviation	0.961		
nu star	64.81		
Approximate Chi Square Value (.05)	47.29	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	1.478
Adjusted Chi Square Value	46.45	95% Jackknife UCL	1.494
		95% Standard Bootstrap UCL	1.461
Anderson-Darling Test Statistic	2.748	95% Bootstrap-t UCL	2.686
Anderson-Darling 5% Critical Value	0.772	95% Hall's Bootstrap UCL	3.572
Kolmogorov-Smirnov Test Statistic	0.311	95% Percentile Bootstrap UCL	1.578
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	1.916
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.297
		97.5% Chebyshev(Mean, Sd) UCL	2.866
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.983
95% Approximate Gamma UCL	1.346		
95% Adjusted Gamma UCL	1.37		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.297

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 28

Raw Statistics

	Log-transformed Statistics
Minimum	-5.64 Log Statistics Not Available
Maximum	6410
Mean	481.5
Median	98.63
SD	1179
Coefficient of Variation	2.449
Skewness	4.596

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.409 Not Available
Shapiro Wilk Critical Value	0.929

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	841	Assuming Lognormal Distribution	
		95% H-UCL	N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	841	95% Adjusted-CLT UCL (Chen 1995)	1017
		95% Modified-t UCL (Johnson-1978)	870.2

Gamma Distribution Test

Gamma Statistics Not Available Data Distribution
Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	1405	95% CLT UCL	829.9
		95% Jackknife UCL	841
		95% Standard Bootstrap UCL	831.4
		95% Bootstrap-t UCL	1688
		95% Hall's Bootstrap UCL	2328
		95% Percentile Bootstrap UCL	872
		95% BCA Bootstrap UCL	1121
		95% Chebyshev(Mean, Sd) UCL	1405
		97.5% Chebyshev(Mean, Sd) UCL	1804
		99% Chebyshev(Mean, Sd) UCL	2589

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	0.222	Minimum of Log Data	-1.505
Maximum	136	Maximum of Log Data	4.913
Mean	18.63	Mean of log Data	2.023
Median	18.63	SD of log Data	1.655
SD	26.3		
Coefficient of Variation	1.412		
Skewness	3.41		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.576	Shapiro Wilk Test Statistic	0.852
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	26.64	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	80.62
95% Adjusted-CLT UCL (Chen-1995)	29.49	95% Chebyshev (MVUE) UCL	72.62
95% Modified-t UCL (Johnson-1978)	27.13	97.5% Chebyshev (MVUE) UCL	92.33
		99% Chebyshev (MVUE) UCL	131

Gamma Distribution Test

k star (bias corrected)	0.63	Data Distribution	
Theta Star	29.56	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	18.63		
MLE of Standard Deviation	23.47		
nu star	39.06		
Approximate Chi Square Value (.05)	25.75	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	26.4
Adjusted Chi Square Value	25.15	95% Jackknife UCL	26.64
		95% Standard Bootstrap UCL	26.4
Anderson-Darling Test Statistic	1.779	95% Bootstrap-t UCL	36.73
Anderson-Darling 5% Critical Value	0.794	95% Hall's Bootstrap UCL	62.93
Kolmogorov-Smirnov Test Statistic	0.244	95% Percentile Bootstrap UCL	26.92
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	29.44
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.21
		97.5% Chebyshev(Mean, Sd) UCL	48.12
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	65.62
95% Approximate Gamma UCL	28.26		
95% Adjusted Gamma UCL	28.94		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 39.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0293	Minimum of Log Data	-3.53
Maximum	19.6	Maximum of Log Data	2.976
Mean	3.357	Mean of log Data	0.3
Median	3.357	SD of log Data	1.704
SD	4.388		
Coefficient of Variation	1.307		
Skewness	2.752		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.61	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	4.694	95% H-UCL	16.44
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.27
95% Adjusted-CLT UCL (Chen-1995)	5.069	97.5% Chebyshev (MVUE) UCL	18.2
95% Modified-t UCL (Johnson-1978)	4.759	99% Chebyshev (MVUE) UCL	25.9

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.625	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.373		
MLE of Mean	3.357		
MLE of Standard Deviation	4.247		
nu star	38.73		
Approximate Chi Square Value (.05)	25.48	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	4.653
Adjusted Chi Square Value	24.88	95% Jackknife UCL	4.694
		95% Standard Bootstrap UCL	4.644
Anderson-Darling Test Statistic	1.93	95% Bootstrap-t UCL	6.219
Anderson-Darling 5% Critical Value	0.795	95% Hall's Bootstrap UCL	11.56
Kolmogorov-Smirnov Test Statistic	0.243	95% Percentile Bootstrap UCL	4.741
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	5.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.792
		97.5% Chebyshev(Mean, Sd) UCL	8.279
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.2
95% Approximate Gamma UCL	5.103		
95% Adjusted Gamma UCL	5.226		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 6.792

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	1.1	Minimum of Log Data	0.0953
Maximum	1340	Maximum of Log Data	7.2
Mean	182.2	Mean of log Data	4.233
Median	182.2	SD of log Data	1.772
SD	260.3		
Coefficient of Variation	1.429		
Skewness	3.403		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	261.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1018
95% Adjusted-CLT UCL (Chen-1995)	289.7	95% Chebyshev (MVUE) UCL	835.3
95% Modified-t UCL (Johnson-1978)	266.4	97.5% Chebyshev (MVUE) UCL	1069
		99% Chebyshev (MVUE) UCL	1528

Gamma Distribution Test

k star (bias corrected)	0.591	Data Distribution	
Theta Star	308.1	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	182.2		
MLE of Standard Deviation	237		
nu star	36.67		
Approximate Chi Square Value (.05)	23.81	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	259.1
Adjusted Chi Square Value	23.23	95% Jackknife UCL	261.6
		95% Standard Bootstrap UCL	258.4
Anderson-Darling Test Statistic	1.796	95% Bootstrap-t UCL	343.9
Anderson-Darling 5% Critical Value	0.798	95% Hall's Bootstrap UCL	628.5
Kolmogorov-Smirnov Test Statistic	0.245	95% Percentile Bootstrap UCL	263.9
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	287.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	386
		97.5% Chebyshev(Mean, Sd) UCL	474.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	647.4
95% Approximate Gamma UCL	280.7		
95% Adjusted Gamma UCL	287.6		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 386

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 17

Raw Statistics

Minimum	14	Log-transformed Statistics	
Maximum	71.6	Minimum of Log Data	2.639
Mean	29.71	Maximum of Log Data	4.271
Median	29.71	Mean of log Data	3.33
SD	11.46	SD of log Data	0.352
Coefficient of Variation	0.386		
Skewness	1.79		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.812	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	33.21	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	33.42
95% Adjusted-CLT UCL (Chen-1995)	33.8	95% Chebyshev (MVUE) UCL	38.02
95% Modified-t UCL (Johnson-1978)	33.32	97.5% Chebyshev (MVUE) UCL	41.64
		99% Chebyshev (MVUE) UCL	48.76

Gamma Distribution Test

k star (bias corrected)	7.46	Data Distribution	
Theta Star	3.983	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	29.71		
MLE of Standard Deviation	10.88		
nu star	462.5		
Approximate Chi Square Value (.05)	413.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	33.1
Adjusted Chi Square Value	411.1	95% Jackknife UCL	33.21
		95% Standard Bootstrap UCL	33.06
Anderson-Darling Test Statistic	1.579	95% Bootstrap-t UCL	34.11
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	36.6
Kolmogorov-Smirnov Test Statistic	0.26	95% Percentile Bootstrap UCL	33.28
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	34.03
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38.68
		97.5% Chebyshev(Mean, Sd) UCL	42.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	50.19
95% Approximate Gamma UCL	33.22		
95% Adjusted Gamma UCL	33.43		

Potential UCL to Use

Use 95% Student's-t UCL	33.21
or 95% Modified-t UCL	33.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	561-01.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	32	Number of Distinct Observations	15
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Raw Statistics

Minimum	0.14	Log-transformed Statistics	
Maximum	3.5	Minimum of Log Data	-1.966
Mean	0.495	Maximum of Log Data	1.253
Median	0.495	Mean of log Data	-0.95
SD	0.572	SD of log Data	0.62
Coefficient of Variation	1.155		
Skewness	4.946		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.41	Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.666	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.588
95% Adjusted-CLT UCL (Chen-1995)	0.756	95% Chebyshev (MVUE) UCL	0.703
95% Modified-t UCL (Johnson-1978)	0.681	97.5% Chebyshev (MVUE) UCL	0.805
		99% Chebyshev (MVUE) UCL	1.007

Gamma Distribution Test

k star (bias corrected)	1.994	Data Distribution	
Theta Star	0.248	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.495		
MLE of Standard Deviation	0.351		
nu star	127.6		
Approximate Chi Square Value (.05)	102.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.661
Adjusted Chi Square Value	101.3	95% Jackknife UCL	0.666
		95% Standard Bootstrap UCL	0.656
Anderson-Darling Test Statistic	2.773	95% Bootstrap-t UCL	0.974
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	1.376
Kolmogorov-Smirnov Test Statistic	0.316	95% Percentile Bootstrap UCL	0.681
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	0.793
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.936
		97.5% Chebyshev(Mean, Sd) UCL	1.126
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.501
95% Approximate Gamma UCL	0.616		
95% Adjusted Gamma UCL	0.623		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.936
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics		
Number of Valid Observations	32	Number of Distinct Observations 16
Raw Statistics		
Minimum	5.9	Log-transformed Statistics Minimum of Log Data 1.775
Maximum	33.1	Maximum of Log Data 3.5
Mean	14.96	Mean of log Data 2.643
Median	14.96	SD of log Data 0.37
SD	5.288	
Coefficient of Variation	0.353	
Skewness	1.047	
Relevant UCL Statistics		
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.855	Lognormal Distribution Test Shapiro Wilk Test Statistic 0.868
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value 0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		
95% Student's-t UCL	16.55	Assuming Lognormal Distribution 95% H-UCL 17.01
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 19.41
95% Adjusted-CLT UCL (Chen-1995)	16.69	97.5% Chebyshev (MVUE) UCL 21.31
95% Modified-t UCL (Johnson-1978)	16.58	99% Chebyshev (MVUE) UCL 25.05
Gamma Distribution Test		
k star (bias corrected)	7.448	Data Distribution Data do not follow a Discernable Distribution (0.05)
Theta Star	2.009	
MLE of Mean	14.96	
MLE of Standard Deviation	5.482	
nu star	476.7	
Approximate Chi Square Value (.05)	427.1	Nonparametric Statistics
Adjusted Level of Significance	0.0416	95% CLT UCL 16.5
Adjusted Chi Square Value	424.6	95% Jackknife UCL 16.55
		95% Standard Bootstrap UCL 16.5
Anderson-Darling Test Statistic	2.115	95% Bootstrap-t UCL 16.75
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL 17.23
Kolmogorov-Smirnov Test Statistic	0.296	95% Percentile Bootstrap UCL 16.53
Kolmogorov-Smirnov 5% Critical Value	0.156	95% BCA Bootstrap UCL 16.58
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 19.04
		97.5% Chebyshev(Mean, Sd) UCL 20.8
		99% Chebyshev(Mean, Sd) UCL 24.26
Assuming Gamma Distribution		
95% Approximate Gamma UCL	16.7	
95% Adjusted Gamma UCL	16.8	
Potential UCL to Use		
		Use 95% Student's-t UCL 16.55
		or 95% Modified-t UCL 16.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	70.7	Minimum of Log Data	4.258
Maximum	438	Maximum of Log Data	6.082
Mean	122.3	Mean of log Data	4.751
Median	122.3	SD of log Data	0.289
SD	59.84		
Coefficient of Variation	0.489		
Skewness	4.992		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.402	Shapiro Wilk Test Statistic	0.649
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	140.2	95% H-UCL	132.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	147.7
95% Adjusted-CLT UCL (Chen-1995)	149.7	97.5% Chebyshev (MVUE) UCL	159.5
95% Modified-t UCL (Johnson-1978)	141.8	99% Chebyshev (MVUE) UCL	182.7

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	8.318	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.7		
MLE of Mean	122.3		
MLE of Standard Deviation	42.4		
nu star	532.4		
Approximate Chi Square Value (.05)	479.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	139.7
Adjusted Chi Square Value	477.2	95% Jackknife UCL	140.2
		95% Standard Bootstrap UCL	139.3
Anderson-Darling Test Statistic	4.402	95% Bootstrap-t UCL	169.1
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	215.4
Kolmogorov-Smirnov Test Statistic	0.394	95% Percentile Bootstrap UCL	142.2
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	154.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	168.4
		97.5% Chebyshev(Mean, Sd) UCL	188.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	227.5
95% Approximate Gamma UCL	135.7		
95% Adjusted Gamma UCL	136.4		

Potential UCL to Use

Use 95% Student's-t UCL 140.2
or 95% Modified-t UCL 141.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	0.42	Minimum of Log Data	-0.868
Maximum	1.5	Maximum of Log Data	0.405
Mean	0.632	Mean of log Data	-0.485
Median	0.632	SD of log Data	0.215
SD	0.178		
Coefficient of Variation	0.281		
Skewness	3.867		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.552	Shapiro Wilk Test Statistic	0.719
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.685	95% H-UCL	0.674
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.735
95% Adjusted-CLT UCL (Chen-1995)	0.706	97.5% Chebyshev (MVUE) UCL	0.781
95% Modified-t UCL (Johnson-1978)	0.689	99% Chebyshev (MVUE) UCL	0.87

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	17.49	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0361		
MLE of Mean	0.632		
MLE of Standard Deviation	0.151		
nu star	1120		
Approximate Chi Square Value (.05)	1043	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.684
Adjusted Chi Square Value	1039	95% Jackknife UCL	0.685
		95% Standard Bootstrap UCL	0.681
Anderson-Darling Test Statistic	3.741	95% Bootstrap-t UCL	0.73
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.937
Kolmogorov-Smirnov Test Statistic	0.306	95% Percentile Bootstrap UCL	0.687
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	0.709
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.769
		97.5% Chebyshev(Mean, Sd) UCL	0.828
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.944
95% Approximate Gamma UCL	0.678		
95% Adjusted Gamma UCL	0.681		

Potential UCL to Use

Use 95% Student's-t UCL 0.685
or 95% Modified-t UCL 0.689

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 32

Raw Statistics

Minimum -89.55
 Maximum 432
 Mean 11.35
 Median 12.17
 SD 96.6
 Coefficient of Variation 8.515
 Skewness 2.834

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.738
 Shapiro Wilk Critical Value 0.93
 Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 40.3
 Assuming Normal Distribution
 95% Student's-t UCL 40.3

Assuming Lognormal Distribution

95% H-UCL N/A
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen 1995) 48.58
 95% Modified-t UCL (Johnson-1978) 41.73

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 85.78
 95% CLT UCL 39.44
 95% Jackknife UCL 40.3
 95% Standard Bootstrap UCL 38.82
 95% Bootstrap-t UCL 55.59
 95% Hall's Bootstrap UCL 172.1
 95% Percentile Bootstrap UCL 40.27
 95% BCA Bootstrap UCL 54.02
 95% Chebyshev(Mean, Sd) UCL 85.78
 97.5% Chebyshev(Mean, Sd) UCL 118
 99% Chebyshev(Mean, Sd) UCL 181.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 16

Raw Statistics

	Log-transformed Statistics	
Minimum	4.6 Minimum of Log Data	1.526
Maximum	30.9 Maximum of Log Data	3.431
Mean	9.375 Mean of log Data	2.177
Median	9.375 SD of log Data	0.317
SD	4.399	
Coefficient of Variation	0.469	
Skewness	4.067	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.533 Shapiro Wilk Test Statistic	0.776
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	10.69 95% H-UCL	10.28
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	11.56
95% Adjusted-CLT UCL (Chen-1995)	11.25 97.5% Chebyshev (MVUE) UCL	12.56
95% Modified-t UCL (Johnson-1978)	10.79 99% Chebyshev (MVUE) UCL	14.51

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	7.64 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.227	
MLE of Mean	9.375	
MLE of Standard Deviation	3.392	
nu star	488.9	
Approximate Chi Square Value (.05)	438.7 Nonparametric Statistics	
Adjusted Level of Significance	0.0416 95% CLT UCL	10.65
Adjusted Chi Square Value	436.1 95% Jackknife UCL	10.69
	95% Standard Bootstrap UCL	10.62
Anderson-Darling Test Statistic	3.204 95% Bootstrap-t UCL	12.48
Anderson-Darling 5% Critical Value	0.747 95% Hall's Bootstrap UCL	17
Kolmogorov-Smirnov Test Statistic	0.36 95% Percentile Bootstrap UCL	10.78
Kolmogorov-Smirnov 5% Critical Value	0.156 95% BCA Bootstrap UCL	11.52
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12.76
	97.5% Chebyshev(Mean, Sd) UCL	14.23
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	17.11
95% Approximate Gamma UCL	10.45	
95% Adjusted Gamma UCL	10.51	

Potential UCL to Use

Use 95% Student's-t UCL 10.69
or 95% Modified-t UCL 10.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 16

Raw Statistics

Minimum -0.009
 Maximum 0.297
 Mean 0.032
 Median 0.032
 SD 0.0501
 Coefficient of Variation 1.566
 Skewness 5.023

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.389
 Shapiro Wilk Critical Value 0.93
 Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 0.047
 Assuming Normal Distribution
 95% Student's-t UCL 0.047

Assuming Lognormal Distribution

95% H-UCL N/A
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen 1995) 0.055
 95% Modified-t UCL (Johnson-1978) 0.0483

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.0706
 95% CLT UCL 0.0466
 95% Jackknife UCL 0.047
 95% Standard Bootstrap UCL 0.0462
 95% Bootstrap-t UCL 0.0715
 95% Hall's Bootstrap UCL 0.11
 95% Percentile Bootstrap UCL 0.049
 95% BCA Bootstrap UCL 0.059
 95% Chebyshev(Mean, Sd) UCL 0.0706
 97.5% Chebyshev(Mean, Sd) UCL 0.0873
 99% Chebyshev(Mean, Sd) UCL 0.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 16

Raw Statistics

		Log-transformed Statistics	
Minimum	11700	Minimum of Log Data	9.367
Maximum	48500	Maximum of Log Data	10.79
Mean	18613	Mean of log Data	9.796
Median	18613	SD of log Data	0.247
SD	6190		
Coefficient of Variation	0.333		
Skewness	3.802		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.581	Shapiro Wilk Test Statistic	0.775
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	20468	95% H-UCL	20041
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22078
95% Adjusted-CLT UCL (Chen-1995)	21198	97.5% Chebyshev (MVUE) UCL	23622
95% Modified-t UCL (Johnson-1978)	20590	99% Chebyshev (MVUE) UCL	26655

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	13.08	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1423		
MLE of Mean	18613		
MLE of Standard Deviation	5146		
nu star	837.3		
Approximate Chi Square Value (.05)	771.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	20412
Adjusted Chi Square Value	767.8	95% Jackknife UCL	20468
		95% Standard Bootstrap UCL	20384
Anderson-Darling Test Statistic	3.014	95% Bootstrap-t UCL	22208
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	28853
Kolmogorov-Smirnov Test Statistic	0.34	95% Percentile Bootstrap UCL	20755
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	21726
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23382
		97.5% Chebyshev(Mean, Sd) UCL	25446
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	29499
95% Approximate Gamma UCL	20209		
95% Adjusted Gamma UCL	20298		

Potential UCL to Use

Use 95% Student's-t UCL 20468
or 95% Modified-t UCL 20590

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	364	Minimum of Log Data	5.897
Maximum	5230	Maximum of Log Data	8.562
Mean	953.8	Mean of log Data	6.691
Median	953.8	SD of log Data	0.513
SD	850		
Coefficient of Variation	0.891		
Skewness	4.431		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.464	Shapiro Wilk Test Statistic	0.806
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1209	95% H-UCL	1098
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1292
95% Adjusted-CLT UCL (Chen-1995)	1327	97.5% Chebyshev (MVUE) UCL	1455
95% Modified-t UCL (Johnson-1978)	1228	99% Chebyshev (MVUE) UCL	1776

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.836	Data do not follow a Discernable Distribution (0.05)	
Theta Star	336.3		
MLE of Mean	953.8		
MLE of Standard Deviation	566.4		
nu star	181.5		
Approximate Chi Square Value (.05)	151.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	1201
Adjusted Chi Square Value	149.9	95% Jackknife UCL	1209
		95% Standard Bootstrap UCL	1189
Anderson-Darling Test Statistic	3.017	95% Bootstrap-t UCL	1675
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	2411
Kolmogorov-Smirnov Test Statistic	0.362	95% Percentile Bootstrap UCL	1215
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	1360
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1609
		97.5% Chebyshev(Mean, Sd) UCL	1892
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2449
95% Approximate Gamma UCL	1144		
95% Adjusted Gamma UCL	1155		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 1609

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

Minimum -0.0052
 Maximum 0.139
 Mean 0.0083
 Median 0.0083
 SD 0.0244
 Coefficient of Variation 2.928
 Skewness 5.259

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.339 Not Available

0.93

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

0.0156

0.0156

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.0197

0.0163

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.0271

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

0.0154

0.0156

0.0154

0.0314

0.0455

0.0163

0.023

0.0271

0.0353

0.0512

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.04	Minimum of Log Data	-3.219
Maximum	2.2	Maximum of Log Data	0.788
Mean	0.678	Mean of log Data	-0.79
Median	0.839	SD of log Data	1.119
SD	0.473		
Coefficient of Variation	0.697		
Skewness	0.785		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.828	Shapiro Wilk Test Statistic	0.79
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.82	95% H-UCL	1.424
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.663
95% Adjusted-CLT UCL (Chen-1995)	0.828	97.5% Chebyshev (MVUE) UCL	2.026
95% Modified-t UCL (Johnson-1978)	0.822	99% Chebyshev (MVUE) UCL	2.739

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.279	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.53		
MLE of Mean	0.678		
MLE of Standard Deviation	0.6		
nu star	81.86		
Approximate Chi Square Value (.05)	62.01	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.815
Adjusted Chi Square Value	61.08	95% Jackknife UCL	0.82
		95% Standard Bootstrap UCL	0.814
Anderson-Darling Test Statistic	2.207	95% Bootstrap-t UCL	0.834
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	0.839
Kolmogorov-Smirnov Test Statistic	0.278	95% Percentile Bootstrap UCL	0.816
Kolmogorov-Smirnov 5% Critical Value	0.159	95% BCA Bootstrap UCL	0.821
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.042
		97.5% Chebyshev(Mean, Sd) UCL	1.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.509
95% Approximate Gamma UCL	0.895		
95% Adjusted Gamma UCL	0.909		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 1.042

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.14	Minimum of Log Data	-1.966
Maximum	0.52	Maximum of Log Data	-0.654
Mean	0.304	Mean of log Data	-1.235
Median	0.304	SD of log Data	0.311
SD	0.094		
Coefficient of Variation	0.309		
Skewness	0.781		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.83	Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.333	95% H-UCL	0.337
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.379
95% Adjusted-CLT UCL (Chen-1995)	0.334	97.5% Chebyshev (MVUE) UCL	0.411
95% Modified-t UCL (Johnson-1978)	0.333	99% Chebyshev (MVUE) UCL	0.474

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	10.06	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0303		
MLE of Mean	0.304		
MLE of Standard Deviation	0.096		
nu star	643.9		
Approximate Chi Square Value (.05)	586	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.332
Adjusted Chi Square Value	583	95% Jackknife UCL	0.333
		95% Standard Bootstrap UCL	0.331
Anderson-Darling Test Statistic	2.407	95% Bootstrap-t UCL	0.337
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.336
Kolmogorov-Smirnov Test Statistic	0.304	95% Percentile Bootstrap UCL	0.331
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	0.334
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.377
		97.5% Chebyshev(Mean, Sd) UCL	0.408
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.47
95% Approximate Gamma UCL	0.334		
95% Adjusted Gamma UCL	0.336		

Potential UCL to Use

Use 95% Student's-t UCL 0.333
or 95% Modified-t UCL 0.333

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 8

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0663	Minimum of Log Data	-2.713
Maximum	0.43	Maximum of Log Data	-0.844
Mean	0.373	Mean of log Data	-1.026
Median	0.373	SD of log Data	0.347
SD	0.0713		
Coefficient of Variation	0.191		
Skewness	-3.497		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.514	Shapiro Wilk Test Statistic	0.388
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.394	95% H-UCL	0.427
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.484
95% Adjusted-CLT UCL (Chen-1995)	0.385	97.5% Chebyshev (MVUE) UCL	0.529
95% Modified-t UCL (Johnson-1978)	0.393	99% Chebyshev (MVUE) UCL	0.617

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	11.96	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0312		
MLE of Mean	0.373		
MLE of Standard Deviation	0.108		
nu star	765.4		
Approximate Chi Square Value (.05)	702.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.393
Adjusted Chi Square Value	699	95% Jackknife UCL	0.394
		95% Standard Bootstrap UCL	0.393
Anderson-Darling Test Statistic	7.183	95% Bootstrap-t UCL	0.387
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.388
Kolmogorov-Smirnov Test Statistic	0.474	95% Percentile Bootstrap UCL	0.391
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	0.389
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.427
		97.5% Chebyshev(Mean, Sd) UCL	0.451
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.498
95% Approximate Gamma UCL	0.406		
95% Adjusted Gamma UCL	0.408		

Potential UCL to Use

Use 95% Student's-t UCL 0.394
or 95% Modified-t UCL 0.393

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 32

Raw Statistics

Minimum -14.96
 Maximum 1370
 Mean 68.91
 Median 1.95
 SD 254.2
 Coefficient of Variation 3.689
 Skewness 4.714

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.325 Not Available

0.93

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

145.1

145.1

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

182.8

151.3

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

264.8

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

142.8

145.1

142.5

327.3

352.4

153.1

202.2

264.8

349.5

516

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

	Log-transformed Statistics	
Minimum	0.128 Minimum of Log Data	-2.056
Maximum	37.78 Maximum of Log Data	3.632
Mean	2.842 Mean of log Data	0.203
Median	2.842 SD of log Data	1.272
SD	6.485	
Coefficient of Variation	2.282	
Skewness	5.354	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.316 Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.93 Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	4.785 95% H-UCL	5.182
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	5.779
95% Adjusted-CLT UCL (Chen-1995)	5.887 97.5% Chebyshev (MVUE) UCL	7.14
95% Modified-t UCL (Johnson-1978)	4.966 99% Chebyshev (MVUE) UCL	9.813

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.669 Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.245	
MLE of Mean	2.842	
MLE of Standard Deviation	3.473	
nu star	42.84	
Approximate Chi Square Value (.05)	28.84 Nonparametric Statistics	
Adjusted Level of Significance	0.0416 95% CLT UCL	4.727
Adjusted Chi Square Value	28.22 95% Jackknife UCL	4.785
	95% Standard Bootstrap UCL	4.654
Anderson-Darling Test Statistic	2.523 95% Bootstrap-t UCL	10.35
Anderson-Darling 5% Critical Value	0.791 95% Hall's Bootstrap UCL	12.58
Kolmogorov-Smirnov Test Statistic	0.314 95% Percentile Bootstrap UCL	5.058
Kolmogorov-Smirnov 5% Critical Value	0.162 95% BCA Bootstrap UCL	6.428
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	7.839
	97.5% Chebyshev(Mean, Sd) UCL	10
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	14.25
95% Approximate Gamma UCL	4.222	
95% Adjusted Gamma UCL	4.314	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 7.839

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0136	Minimum of Log Data	-4.298
Maximum	6.788	Maximum of Log Data	1.915
Mean	0.462	Mean of log Data	-1.972
Median	0.462	SD of log Data	1.623
SD	1.174		
Coefficient of Variation	2.541		
Skewness	5.363		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.309	Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.814	95% H-UCL	1.345
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.248
95% Adjusted-CLT UCL (Chen-1995)	1.013	97.5% Chebyshev (MVUE) UCL	1.582
95% Modified-t UCL (Johnson-1978)	0.847	99% Chebyshev (MVUE) UCL	2.239

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.497	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.93		
MLE of Mean	0.462		
MLE of Standard Deviation	0.655		
nu star	31.8		
Approximate Chi Square Value (.05)	19.92	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	0.803
Adjusted Chi Square Value	19.41	95% Jackknife UCL	0.814
		95% Standard Bootstrap UCL	0.808
Anderson-Darling Test Statistic	2.688	95% Bootstrap-t UCL	1.77
Anderson-Darling 5% Critical Value	0.808	95% Hall's Bootstrap UCL	2.211
Kolmogorov-Smirnov Test Statistic	0.29	95% Percentile Bootstrap UCL	0.871
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL	1.082
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.366
		97.5% Chebyshev(Mean, Sd) UCL	1.758
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.526
95% Approximate Gamma UCL	0.738		
95% Adjusted Gamma UCL	0.757		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 1.366

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	0.155	Minimum of Log Data	-1.864
Maximum	412.7	Maximum of Log Data	6.023
Mean	27.55	Mean of log Data	1.713
Median	27.55	SD of log Data	2.159
SD	71.47		
Coefficient of Variation	2.594		
Skewness	5.36		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.31	Shapiro Wilk Test Statistic	0.827
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	48.98	95% H-UCL	277.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	152.9
95% Adjusted-CLT UCL (Chen-1995)	61.13	97.5% Chebyshev (MVUE) UCL	198.9
95% Modified-t UCL (Johnson-1978)	50.97	99% Chebyshev (MVUE) UCL	289.4

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.391	Data do not follow a Discernable Distribution (0.05)	
Theta Star	70.39		
MLE of Mean	27.55		
MLE of Standard Deviation	44.04		
nu star	25.05		
Approximate Chi Square Value (.05)	14.65	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	48.34
Adjusted Chi Square Value	14.22	95% Jackknife UCL	48.98
		95% Standard Bootstrap UCL	48.31
Anderson-Darling Test Statistic	2.431	95% Bootstrap-t UCL	110.3
Anderson-Darling 5% Critical Value	0.831	95% Hall's Bootstrap UCL	134.2
Kolmogorov-Smirnov Test Statistic	0.269	95% Percentile Bootstrap UCL	52.51
Kolmogorov-Smirnov 5% Critical Value	0.166	95% BCA Bootstrap UCL	67.76
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	82.62
		97.5% Chebyshev(Mean, Sd) UCL	106.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	153.3
95% Approximate Gamma UCL	47.11		
95% Adjusted Gamma UCL	48.53		

Potential UCL to Use Use 97.5% Chebyshev (Mean, Sd) UCL 106.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 32 Number of Distinct Observations 17

Raw Statistics

		Log-transformed Statistics	
Minimum	18.6	Minimum of Log Data	2.923
Maximum	86.9	Maximum of Log Data	4.465
Mean	34.01	Mean of log Data	3.483
Median	34.01	SD of log Data	0.284
SD	12.1		
Coefficient of Variation	0.356		
Skewness	2.949		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.66	Shapiro Wilk Test Statistic	0.821
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	37.64	95% H-UCL	37.12
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	41.37
95% Adjusted-CLT UCL (Chen-1995)	38.72	97.5% Chebyshev (MVUE) UCL	44.63
95% Modified-t UCL (Johnson-1978)	37.83	99% Chebyshev (MVUE) UCL	51.03

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	10.42	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.263		
MLE of Mean	34.01		
MLE of Standard Deviation	10.53		
nu star	667.2		
Approximate Chi Square Value (.05)	608.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	37.53
Adjusted Chi Square Value	605.2	95% Jackknife UCL	37.64
		95% Standard Bootstrap UCL	37.36
Anderson-Darling Test Statistic	2.86	95% Bootstrap-t UCL	40.48
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	56.76
Kolmogorov-Smirnov Test Statistic	0.304	95% Percentile Bootstrap UCL	37.76
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	38.87
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	43.34
		97.5% Chebyshev(Mean, Sd) UCL	47.37
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	55.3
95% Approximate Gamma UCL	37.31		
95% Adjusted Gamma UCL	37.49		

Potential UCL to Use

Use 95% Student's-t UCL 37.64
or 95% Modified-t UCL 37.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	561-02.wst		
Full Precision	OFF		
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	

Antimony

General Statistics

Number of Valid Observations	31	Number of Distinct Observations	12
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Raw Statistics

Minimum	0.13	Log-transformed Statistics	
Maximum	22	Minimum of Log Data	-2.04
Mean	2.348	Maximum of Log Data	3.091
Median	2.348	Mean of log Data	0.142
SD	3.815	SD of log Data	1.317
Coefficient of Variation	1.625		
Skewness	4.812		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.411	Shapiro Wilk Test Statistic	0.787
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.511	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	5.419
95% Adjusted-CLT UCL (Chen-1995)	4.108	95% Chebyshev (MVUE) UCL	5.924
95% Modified-t UCL (Johnson-1978)	3.609	97.5% Chebyshev (MVUE) UCL	7.356
		99% Chebyshev (MVUE) UCL	10.17

Gamma Distribution Test

k star (bias corrected)	0.772	Data Distribution	
Theta Star	3.042	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.348		
MLE of Standard Deviation	2.673		
nu star	47.85		
Approximate Chi Square Value (.05)	32.97	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	3.475
Adjusted Chi Square Value	32.29	95% Jackknife UCL	3.511
		95% Standard Bootstrap UCL	3.444
Anderson-Darling Test Statistic	2.975	95% Bootstrap-t UCL	5.324
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL	8.237
Kolmogorov-Smirnov Test Statistic	0.29	95% Percentile Bootstrap UCL	3.639
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	4.574
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.334
		97.5% Chebyshev(Mean, Sd) UCL	6.627
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.165
95% Approximate Gamma UCL	3.407		
95% Adjusted Gamma UCL	3.48		

Potential UCL to Use

		Use 95% Chebyshev (Mean, Sd) UCL	5.334
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics		
Number of Valid Observations	31	Number of Distinct Observations 15
Raw Statistics		
Minimum	4.6	Log-transformed Statistics Minimum of Log Data 1.526
Maximum	39.6	Maximum of Log Data 3.679
Mean	11.09	Mean of log Data 2.305
Median	11.09	SD of log Data 0.431
SD	6.287	
Coefficient of Variation	0.567	
Skewness	3.342	
Relevant UCL Statistics		
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.602	Lognormal Distribution Test Shapiro Wilk Test Statistic 0.818
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value 0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		
95% Student's-t UCL	13.01	Assuming Lognormal Distribution 95% H-UCL 12.75
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 14.79
95% Adjusted-CLT UCL (Chen-1995)	13.67	97.5% Chebyshev (MVUE) UCL 16.45
95% Modified-t UCL (Johnson-1978)	13.12	99% Chebyshev (MVUE) UCL 19.7
Gamma Distribution Test		
k star (bias corrected)	4.632	Data Distribution Data do not follow a Discernable Distribution (0.05)
Theta Star	2.395	
MLE of Mean	11.09	
MLE of Standard Deviation	5.154	
nu star	287.2	
Approximate Chi Square Value (.05)	248.9	Nonparametric Statistics
Adjusted Level of Significance	0.0413	95% CLT UCL 12.95
Adjusted Chi Square Value	247	95% Jackknife UCL 13.01
		95% Standard Bootstrap UCL 12.87
Anderson-Darling Test Statistic	2.933	95% Bootstrap-t UCL 14.72
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL 23.03
Kolmogorov-Smirnov Test Statistic	0.312	95% Percentile Bootstrap UCL 13
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL 14.05
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 16.02
		97.5% Chebyshev(Mean, Sd) UCL 18.14
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 22.33
95% Approximate Gamma UCL	12.8	
95% Adjusted Gamma UCL	12.9	
Potential UCL to Use		Use 95% Student's-t UCL 13.01 or 95% Modified-t UCL 13.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data	-1.139
Maximum	1	Maximum of Log Data	0
Mean	0.593	Mean of log Data	-0.548
Median	0.593	SD of log Data	0.23
SD	0.135		
Coefficient of Variation	0.228		
Skewness	0.775		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Test Statistic	0.833	Shapiro Wilk Critical Value	0.929
Shapiro Wilk Critical Value	0.929	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.634	95% H-UCL	0.639
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.701
95% Adjusted-CLT UCL (Chen-1995)	0.636	97.5% Chebyshev (MVUE) UCL	0.747
95% Modified-t UCL (Johnson-1978)	0.635	99% Chebyshev (MVUE) UCL	0.839

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	18.22	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0325		
MLE of Mean	0.593		
MLE of Standard Deviation	0.139		
nu star	1130		
Approximate Chi Square Value (.05)	1053	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.633
Adjusted Chi Square Value	1049	95% Jackknife UCL	0.634
		95% Standard Bootstrap UCL	0.631
Anderson-Darling Test Statistic	2.714	95% Bootstrap-t UCL	0.641
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.646
Kolmogorov-Smirnov Test Statistic	0.288	95% Percentile Bootstrap UCL	0.633
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL	0.635
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.699
		97.5% Chebyshev(Mean, Sd) UCL	0.744
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.834
95% Approximate Gamma UCL	0.636		
95% Adjusted Gamma UCL	0.639		

Potential UCL to Use

Use 95% Student's-t UCL 0.634
or 95% Modified-t UCL 0.635

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.046	Minimum of Log Data	-3.079
Maximum	1.2	Maximum of Log Data	0.182
Mean	0.253	Mean of log Data	-1.586
Median	0.253	SD of log Data	0.659
SD	0.205		
Coefficient of Variation	0.811		
Skewness	3.566		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.566	Shapiro Wilk Test Statistic	0.813
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.315	95% H-UCL	0.326
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.392
95% Adjusted-CLT UCL (Chen-1995)	0.338	97.5% Chebyshev (MVUE) UCL	0.453
95% Modified-t UCL (Johnson-1978)	0.319	99% Chebyshev (MVUE) UCL	0.571

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	2.31	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.109		
MLE of Mean	0.253		
MLE of Standard Deviation	0.166		
nu star	143.2		
Approximate Chi Square Value (.05)	116.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.313
Adjusted Chi Square Value	115.2	95% Jackknife UCL	0.315
		95% Standard Bootstrap UCL	0.311
Anderson-Darling Test Statistic	3.064	95% Bootstrap-t UCL	0.381
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	0.635
Kolmogorov-Smirnov Test Statistic	0.32	95% Percentile Bootstrap UCL	0.318
Kolmogorov-Smirnov 5% Critical Value	0.159	95% BCA Bootstrap UCL	0.346
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.413
		97.5% Chebyshev(Mean, Sd) UCL	0.482
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.619
95% Approximate Gamma UCL	0.31		
95% Adjusted Gamma UCL	0.314		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.413

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0906	Minimum of Log Data	-2.401
Maximum	1.01	Maximum of Log Data	0.00995
Mean	0.279	Mean of log Data	-1.404
Median	0.279	SD of log Data	0.51
SD	0.166		
Coefficient of Variation	0.595		
Skewness	2.976		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.645	Shapiro Wilk Test Statistic	0.821
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.33	95% H-UCL	0.335
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.395
95% Adjusted-CLT UCL (Chen-1995)	0.345	97.5% Chebyshev (MVUE) UCL	0.445
95% Modified-t UCL (Johnson-1978)	0.332	99% Chebyshev (MVUE) UCL	0.544

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	3.69	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0756		
MLE of Mean	0.279		
MLE of Standard Deviation	0.145		
nu star	228.8		
Approximate Chi Square Value (.05)	194.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.328
Adjusted Chi Square Value	193	95% Jackknife UCL	0.33
		95% Standard Bootstrap UCL	0.327
Anderson-Darling Test Statistic	2.911	95% Bootstrap-t UCL	0.361
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	0.593
Kolmogorov-Smirnov Test Statistic	0.308	95% Percentile Bootstrap UCL	0.331
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	0.348
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.409
		97.5% Chebyshev(Mean, Sd) UCL	0.465
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.576
95% Approximate Gamma UCL	0.328		
95% Adjusted Gamma UCL	0.331		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.409

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 28

Raw Statistics

Minimum -119.8
 Maximum 1370
 Mean 74.57
 Median 21.9
 SD 272.8
 Coefficient of Variation 3.659
 Skewness 3.913

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.557 Not Available

0.929

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

Assuming Lognormal Distribution

157.7 95% H-UCL

95% UCLs (Adjusted for Skewness)

157.7 95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

192

163.5

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	288.2	95% CLT UCL	155.2
		95% Jackknife UCL	157.7
		95% Standard Bootstrap UCL	153.4
		95% Bootstrap-t UCL	264.4
		95% Hall's Bootstrap UCL	522.3
		95% Percentile Bootstrap UCL	164.8
		95% BCA Bootstrap UCL	214.7
		95% Chebyshev(Mean, Sd) UCL	288.2
		97.5% Chebyshev(Mean, Sd) UCL	380.6
		99% Chebyshev(Mean, Sd) UCL	562.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 13

Raw Statistics

	Log-transformed Statistics	
Minimum	4.5 Minimum of Log Data	1.504
Maximum	31 Maximum of Log Data	3.434
Mean	9.964 Mean of log Data	2.229
Median	9.964 SD of log Data	0.355
SD	4.702	
Coefficient of Variation	0.472	
Skewness	3.342	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.592 Shapiro Wilk Test Statistic	0.797
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	11.4 95% H-UCL	11.14
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12.68
95% Adjusted-CLT UCL (Chen-1995)	11.89 97.5% Chebyshev (MVUE) UCL	13.89
95% Modified-t UCL (Johnson-1978)	11.48 99% Chebyshev (MVUE) UCL	16.28

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	6.603 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.509	
MLE of Mean	9.964	
MLE of Standard Deviation	3.878	
nu star	409.4	
Approximate Chi Square Value (.05)	363.5 Nonparametric Statistics	
Adjusted Level of Significance	0.0413 95% CLT UCL	11.35
Adjusted Chi Square Value	361.1 95% Jackknife UCL	11.4
	95% Standard Bootstrap UCL	11.34
Anderson-Darling Test Statistic	3.174 95% Bootstrap-t UCL	12.94
Anderson-Darling 5% Critical Value	0.747 95% Hall's Bootstrap UCL	19.28
Kolmogorov-Smirnov Test Statistic	0.354 95% Percentile Bootstrap UCL	11.34
Kolmogorov-Smirnov 5% Critical Value	0.158 95% BCA Bootstrap UCL	12.04
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	13.65
	97.5% Chebyshev(Mean, Sd) UCL	15.24
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	18.37
95% Approximate Gamma UCL	11.22	
95% Adjusted Gamma UCL	11.3	

Potential UCL to Use

Use 95% Student's-t UCL 11.4
or 95% Modified-t UCL 11.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

Minimum -0.0175
 Maximum 0.0438
 Mean 0.0196
 Median 0.0196
 SD 0.0103
 Coefficient of Variation 0.528
 Skewness -1.073

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic

Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

Lognormal Distribution Test

0.8 Not Available

0.929

Assuming Normal Distribution

95% Student's-t UCL

Assuming Normal Distribution

95% Student's-t UCL

0.0227

0.0227

Assuming Lognormal Distribution

95% H-UCL

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995)

95% Modified-t UCL (Johnson-1978)

N/A

0.0222

0.0226

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL

0.0276

95% CLT UCL

95% Jackknife UCL

95% Standard Bootstrap UCL

95% Bootstrap-t UCL

95% Hall's Bootstrap UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% Chebyshev(Mean, Sd) UCL

97.5% Chebyshev(Mean, Sd) UCL

99% Chebyshev(Mean, Sd) UCL

0.0226

0.0227

0.0225

0.0224

0.0224

0.0224

0.0222

0.0276

0.0311

0.038

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

		Log-transformed Statistics	
Minimum	174	Minimum of Log Data	5.159
Maximum	2230	Maximum of Log Data	7.71
Mean	1006	Mean of log Data	6.84
Median	1006	SD of log Data	0.436
SD	358.7		
Coefficient of Variation	0.357		
Skewness	1.024		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.784	Shapiro Wilk Test Statistic	0.728
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1115	95% H-UCL	1193
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1385
95% Adjusted-CLT UCL (Chen-1995)	1125	97.5% Chebyshev (MVUE) UCL	1542
95% Modified-t UCL (Johnson-1978)	1117	99% Chebyshev (MVUE) UCL	1849

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	6.252	Data do not follow a Discernable Distribution (0.05)	
Theta Star	160.9		
MLE of Mean	1006		
MLE of Standard Deviation	402.4		
nu star	387.6		
Approximate Chi Square Value (.05)	343	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	1112
Adjusted Chi Square Value	340.7	95% Jackknife UCL	1115
		95% Standard Bootstrap UCL	1114
Anderson-Darling Test Statistic	3.471	95% Bootstrap-t UCL	1127
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	1189
Kolmogorov-Smirnov Test Statistic	0.325	95% Percentile Bootstrap UCL	1114
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	1129
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1287
		97.5% Chebyshev(Mean, Sd) UCL	1408
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1647
95% Approximate Gamma UCL	1137		
95% Adjusted Gamma UCL	1145		

Potential UCL to Use

Use 95% Student's-t UCL 1115
or 95% Modified-t UCL 1117

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

Minimum -0.005
 Maximum 0.19
 Mean 0.0199
 Median 0.0199
 SD 0.0348
 Coefficient of Variation 1.748
 Skewness 4.179

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.499

Shapiro Wilk Critical Value 0.929

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 0.0305

Assuming Normal Distribution

95% Student's-t UCL 0.0305

Assuming Lognormal Distribution

95% H-UCL N/A

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen 1995) 0.0352

95% Modified-t UCL (Johnson-1978) 0.0313

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.0471

95% CLT UCL 0.0302

95% Jackknife UCL 0.0305

95% Standard Bootstrap UCL 0.03

95% Bootstrap-t UCL 0.0456

95% Hall's Bootstrap UCL 0.0787

95% Percentile Bootstrap UCL 0.0308

95% BCA Bootstrap UCL 0.0368

95% Chebyshev(Mean, Sd) UCL 0.0471

97.5% Chebyshev(Mean, Sd) UCL 0.0589

99% Chebyshev(Mean, Sd) UCL 0.082

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 14

Raw Statistics

		Log-transformed Statistics	
Minimum	0.04	Minimum of Log Data	-3.219
Maximum	79	Maximum of Log Data	4.369
Mean	5.027	Mean of log Data	-0.117
Median	1	SD of log Data	1.852
SD	14.56		
Coefficient of Variation	2.896		
Skewness	4.739		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.36	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	9.464	95% H-UCL	16.64
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.7
95% Adjusted-CLT UCL (Chen-1995)	11.7	97.5% Chebyshev (MVUE) UCL	16.32
95% Modified-t UCL (Johnson-1978)	9.835	99% Chebyshev (MVUE) UCL	23.43

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	0.367	Data appear Lognormal at 5% Significance Level	
Theta Star	13.69		
MLE of Mean	5.027		
MLE of Standard Deviation	8.295		
nu star	22.77		
Approximate Chi Square Value (.05)	12.92	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	9.327
Adjusted Chi Square Value	12.5	95% Jackknife UCL	9.464
		95% Standard Bootstrap UCL	9.413
Anderson-Darling Test Statistic	2.404	95% Bootstrap-t UCL	24.11
Anderson-Darling 5% Critical Value	0.836	95% Hall's Bootstrap UCL	23.48
Kolmogorov-Smirnov Test Statistic	0.331	95% Percentile Bootstrap UCL	9.619
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL	12.92
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.42
		97.5% Chebyshev(Mean, Sd) UCL	21.35
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	31.04
95% Approximate Gamma UCL	8.861		
95% Adjusted Gamma UCL	9.153		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 16.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 12

Raw Statistics

		Log-transformed Statistics	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	1.2	Maximum of Log Data	0.182
Mean	0.348	Mean of log Data	-1.158
Median	0.348	SD of log Data	0.426
SD	0.199		
Coefficient of Variation	0.572		
Skewness	3.013		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.632	Shapiro Wilk Test Statistic	0.841
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	0.409	95% H-UCL	0.398
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.461
95% Adjusted-CLT UCL (Chen-1995)	0.427	97.5% Chebyshev (MVUE) UCL	0.512
95% Modified-t UCL (Johnson-1978)	0.412	99% Chebyshev (MVUE) UCL	0.613

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	4.575	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.076		
MLE of Mean	0.348		
MLE of Standard Deviation	0.163		
nu star	283.6		
Approximate Chi Square Value (.05)	245.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	0.407
Adjusted Chi Square Value	243.7	95% Jackknife UCL	0.409
		95% Standard Bootstrap UCL	0.406
Anderson-Darling Test Statistic	2.616	95% Bootstrap-t UCL	0.461
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.706
Kolmogorov-Smirnov Test Statistic	0.344	95% Percentile Bootstrap UCL	0.408
Kolmogorov-Smirnov 5% Critical Value	0.158	95% BCA Bootstrap UCL	0.431
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.504
		97.5% Chebyshev(Mean, Sd) UCL	0.571
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.704
95% Approximate Gamma UCL	0.402		
95% Adjusted Gamma UCL	0.405		

Potential UCL to Use

Use 95% Student's-t UCL 0.409
or 95% Modified-t UCL 0.412

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 11

Raw Statistics

		Log-transformed Statistics	
Minimum	0.0989	Minimum of Log Data	-2.314
Maximum	9.829	Maximum of Log Data	2.285
Mean	1.135	Mean of log Data	-0.227
Median	1.135	SD of log Data	0.763
SD	1.655		
Coefficient of Variation	1.458		
Skewness	5.128		

Relevant UCL Statistics

		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.349	Shapiro Wilk Test Statistic	0.78
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

		Assuming Lognormal Distribution	
95% Student's-t UCL	1.639	95% H-UCL	1.441
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.743
95% Adjusted-CLT UCL (Chen-1995)	1.916	97.5% Chebyshev (MVUE) UCL	2.041
95% Modified-t UCL (Johnson-1978)	1.685	99% Chebyshev (MVUE) UCL	2.627

Gamma Distribution Test

		Data Distribution	
k star (bias corrected)	1.43	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.793		
MLE of Mean	1.135		
MLE of Standard Deviation	0.949		
nu star	88.67		
Approximate Chi Square Value (.05)	67.96	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	1.624
Adjusted Chi Square Value	66.95	95% Jackknife UCL	1.639
		95% Standard Bootstrap UCL	1.62
Anderson-Darling Test Statistic	3.578	95% Bootstrap-t UCL	2.731
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	3.673
Kolmogorov-Smirnov Test Statistic	0.336	95% Percentile Bootstrap UCL	1.695
Kolmogorov-Smirnov 5% Critical Value	0.161	95% BCA Bootstrap UCL	2.079
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.43
		97.5% Chebyshev(Mean, Sd) UCL	2.991
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.092
95% Approximate Gamma UCL	1.481		
95% Adjusted Gamma UCL	1.503		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.43

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 28

Raw Statistics

Minimum -5.64
 Maximum 6410
 Mean 455.9
 Median 82.4
 SD 1184
 Coefficient of Variation 2.597
 Skewness 4.605

Log-transformed Statistics

Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.398
 Shapiro Wilk Critical Value 0.929
 Data not Normal at 5% Significance Level

Lognormal Distribution Test

Not Available

Assuming Normal Distribution

95% Student's-t UCL 816.9
 Assuming Normal Distribution
 95% Student's-t UCL 816.9

Assuming Lognormal Distribution

95% H-UCL N/A
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen 1995) 993.7
 95% Modified-t UCL (Johnson-1978) 846.2

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 1383
 95% CLT UCL 805.8
 95% Jackknife UCL 816.9
 95% Standard Bootstrap UCL 800.7
 95% Bootstrap-t UCL 1763
 95% Hall's Bootstrap UCL 1988
 95% Percentile Bootstrap UCL 835
 95% BCA Bootstrap UCL 1135
 95% Chebyshev(Mean, Sd) UCL 1383
 97.5% Chebyshev(Mean, Sd) UCL 1784
 99% Chebyshev(Mean, Sd) UCL 2572

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

Minimum	0.439	Log-transformed Statistics	
Maximum	136	Minimum of Log Data	-0.823
Mean	20.18	Maximum of Log Data	4.913
Median	20.18	Mean of log Data	2.177
SD	26.12	SD of log Data	1.59
Coefficient of Variation	1.294		
Skewness	3.294		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical Value	0.929	Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	28.15	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	79.07
95% Adjusted-CLT UCL (Chen-1995)	30.87	95% Chebyshev (MVUE) UCL	74.61
95% Modified-t UCL (Johnson-1978)	28.61	97.5% Chebyshev (MVUE) UCL	94.47
		99% Chebyshev (MVUE) UCL	133.5

Gamma Distribution Test

k star (bias corrected)	0.678	Data Distribution	
Theta Star	29.79	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	20.18		
MLE of Standard Deviation	24.52		
nu star	42.01		
Approximate Chi Square Value (.05)	28.15	Nonparametric Statistics	
Adjusted Level of Significance	0.0413	95% CLT UCL	27.9
Adjusted Chi Square Value	27.52	95% Jackknife UCL	28.15
		95% Standard Bootstrap UCL	27.64
Anderson-Darling Test Statistic	2.418	95% Bootstrap-t UCL	36.83
Anderson-Darling 5% Critical Value	0.79	95% Hall's Bootstrap UCL	67.1
Kolmogorov-Smirnov Test Statistic	0.299	95% Percentile Bootstrap UCL	27.98
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL	32.14
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	40.63
		97.5% Chebyshev(Mean, Sd) UCL	49.48
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	66.86
95% Approximate Gamma UCL	30.12		
95% Adjusted Gamma UCL	30.81		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 40.63

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

	Log-transformed Statistics	
Minimum	0.063 Minimum of Log Data	-2.765
Maximum	19.6 Maximum of Log Data	2.976
Mean	3.7 Mean of log Data	0.506
Median	3.7 SD of log Data	1.607
SD	4.335	
Coefficient of Variation	1.172	
Skewness	2.615	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.626 Shapiro Wilk Test Statistic	0.796
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	5.021 95% H-UCL	15.58
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	14.52
95% Adjusted-CLT UCL (Chen-1995)	5.371 97.5% Chebyshev (MVUE) UCL	18.41
95% Modified-t UCL (Johnson-1978)	5.082 99% Chebyshev (MVUE) UCL	26.04

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.696 Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.314	
MLE of Mean	3.7	
MLE of Standard Deviation	4.434	
nu star	43.16	
Approximate Chi Square Value (.05)	29.1 Nonparametric Statistics	
Adjusted Level of Significance	0.0413 95% CLT UCL	4.98
Adjusted Chi Square Value	28.46 95% Jackknife UCL	5.021
	95% Standard Bootstrap UCL	4.961
Anderson-Darling Test Statistic	2.627 95% Bootstrap-t UCL	6.172
Anderson-Darling 5% Critical Value	0.788 95% Hall's Bootstrap UCL	12.53
Kolmogorov-Smirnov Test Statistic	0.297 95% Percentile Bootstrap UCL	5.057
Kolmogorov-Smirnov 5% Critical Value	0.164 95% BCA Bootstrap UCL	5.418
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	7.093
	97.5% Chebyshev(Mean, Sd) UCL	8.562
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	11.45
95% Approximate Gamma UCL	5.488	
95% Adjusted Gamma UCL	5.612	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 7.093

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

	Log-transformed Statistics	
Minimum	3.85 Minimum of Log Data	1.348
Maximum	1340 Maximum of Log Data	7.2
Mean	197.9 Mean of log Data	4.408
Median	197.9 SD of log Data	1.67
SD	258.5	
Coefficient of Variation	1.306	
Skewness	3.286	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.586 Shapiro Wilk Test Statistic	0.805
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	276.7 95% H-UCL	912.4
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	812.7
95% Adjusted-CLT UCL (Chen-1995)	303.6 97.5% Chebyshev (MVUE) UCL	1034
95% Modified-t UCL (Johnson-1978)	281.3 99% Chebyshev (MVUE) UCL	1469

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	0.644 Data do not follow a Discernable Distribution (0.05)	
Theta Star	307.5	
MLE of Mean	197.9	
MLE of Standard Deviation	246.7	
nu star	39.9	
Approximate Chi Square Value (.05)	26.43 Nonparametric Statistics	
Adjusted Level of Significance	0.0413 95% CLT UCL	274.3
Adjusted Chi Square Value	25.82 95% Jackknife UCL	276.7
	95% Standard Bootstrap UCL	270.9
Anderson-Darling Test Statistic	2.464 95% Bootstrap-t UCL	369.4
Anderson-Darling 5% Critical Value	0.793 95% Hall's Bootstrap UCL	669.3
Kolmogorov-Smirnov Test Statistic	0.303 95% Percentile Bootstrap UCL	281
Kolmogorov-Smirnov 5% Critical Value	0.165 95% BCA Bootstrap UCL	319.6
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	400.3
	97.5% Chebyshev(Mean, Sd) UCL	487.9
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	659.9
95% Approximate Gamma UCL	298.8	
95% Adjusted Gamma UCL	305.9	

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 400.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 31 Number of Distinct Observations 15

Raw Statistics

	Log-transformed Statistics	
Minimum	15.3 Minimum of Log Data	2.728
Maximum	71.6 Maximum of Log Data	4.271
Mean	31.22 Mean of log Data	3.389
Median	31.22 SD of log Data	0.326
SD	10.91	
Coefficient of Variation	0.35	
Skewness	1.748	

Relevant UCL Statistics

	Lognormal Distribution Test	
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.78 Shapiro Wilk Test Statistic	0.857
Shapiro Wilk Critical Value	0.929 Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Lognormal Distribution	
95% Student's-t UCL	34.55 95% H-UCL	34.81
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	39.32
95% Adjusted-CLT UCL (Chen-1995)	35.1 97.5% Chebyshev (MVUE) UCL	42.83
95% Modified-t UCL (Johnson-1978)	34.65 99% Chebyshev (MVUE) UCL	49.74

Gamma Distribution Test

	Data Distribution	
k star (bias corrected)	8.808 Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.545	
MLE of Mean	31.22	
MLE of Standard Deviation	10.52	
nu star	546.1	
Approximate Chi Square Value (.05)	492.9 Nonparametric Statistics	
Adjusted Level of Significance	0.0413 95% CLT UCL	34.45
Adjusted Chi Square Value	490.1 95% Jackknife UCL	34.55
	95% Standard Bootstrap UCL	34.48
Anderson-Darling Test Statistic	2.418 95% Bootstrap-t UCL	35.52
Anderson-Darling 5% Critical Value	0.746 95% Hall's Bootstrap UCL	37.56
Kolmogorov-Smirnov Test Statistic	0.296 95% Percentile Bootstrap UCL	34.56
Kolmogorov-Smirnov 5% Critical Value	0.158 95% BCA Bootstrap UCL	34.97
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	39.76
	97.5% Chebyshev(Mean, Sd) UCL	43.46
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	50.72
95% Approximate Gamma UCL	34.59	
95% Adjusted Gamma UCL	34.79	

Potential UCL to Use

Use 95% Student's-t UCL 34.55
or 95% Modified-t UCL 34.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	567-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Chromium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	567-04.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Aluminum

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
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Raw Statistics

Raw Statistics	Log-transformed Statistics	
Minimum	11200 Minimum of Log Data	9.324
Maximum	13400 Maximum of Log Data	9.503
Mean	12300 Mean of log Data	9.417
Median	12300 SD of log Data	0.0366
SD	449.1	
Coefficient of Variation	0.0365	
Skewness	0	

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574 Shapiro Wilk Test Statistic	0.573
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	12522 95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	12845
95% Adjusted-CLT UCL (Chen-1995)	12505 97.5% Chebyshev (MVUE) UCL	13081
95% Modified-t UCL (Johnson-1978)	12522 99% Chebyshev (MVUE) UCL	13544

Gamma Distribution Test

Gamma Distribution Test	Data Distribution	
k star (bias corrected)	622.8 Data do not follow a Discernable Distribution (0.05)	
Theta Star	19.75	
MLE of Mean	12300	
MLE of Standard Deviation	492.9	
nu star	16194	
Approximate Chi Square Value (.05)	15899 Nonparametric Statistics	
Adjusted Level of Significance	0.0301 95% CLT UCL	12505
Adjusted Chi Square Value	15857 95% Jackknife UCL	12522
	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.075 95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732 95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.427 95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236 95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	12843
	97.5% Chebyshev(Mean, Sd) UCL	13078
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	13539
95% Approximate Gamma UCL	12528	
95% Adjusted Gamma UCL	12561	

Potential UCL to Use

Use 95% Student's-t UCL	12522
or 95% Modified-t UCL	12522

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
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Raw Statistics

Minimum	6.8	Log-transformed Statistics	
Maximum	13.6	Minimum of Log Data	1.917
Mean	10.2	Maximum of Log Data	2.61
Median	10.2	Mean of log Data	2.313
SD	1.388	SD of log Data	0.143
Coefficient of Variation	0.136		
Skewness	-3.40E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.561
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.89	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11
95% Adjusted-CLT UCL (Chen-1995)	10.83	95% Chebyshev (MVUE) UCL	11.97
95% Modified-t UCL (Johnson-1978)	10.89	97.5% Chebyshev (MVUE) UCL	12.74
		99% Chebyshev (MVUE) UCL	14.25

Gamma Distribution Test

k star (bias corrected)	42.63	Data Distribution	
Theta Star	0.239	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.2		
MLE of Standard Deviation	1.562		
nu star	1108		
Approximate Chi Square Value (.05)	1032	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.83
Adjusted Chi Square Value	1022	95% Jackknife UCL	10.89
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.091	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.441	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.88
		97.5% Chebyshev(Mean, Sd) UCL	12.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.03
95% Approximate Gamma UCL	10.95		
95% Adjusted Gamma UCL	11.07		

Potential UCL to Use		Use 95% Student's-t UCL	10.89
		or 95% Modified-t UCL	10.89

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.347	Minimum of Log Data	-1.058
Maximum	1.57	Maximum of Log Data	0.451
Mean	0.959	Mean of log Data	-0.0826
Median	0.959	SD of log Data	0.323
SD	0.25		
Coefficient of Variation	0.26		
Skewness	-3.16E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.521
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.082	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.162
95% Adjusted-CLT UCL (Chen-1995)	1.072	95% Chebyshev (MVUE) UCL	1.348
95% Modified-t UCL (Johnson-1978)	1.082	97.5% Chebyshev (MVUE) UCL	1.513
		99% Chebyshev (MVUE) UCL	1.838

Gamma Distribution Test

k star (bias corrected)	9.746	Data Distribution	
Theta Star	0.0984	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.959		
MLE of Standard Deviation	0.307		
nu star	253.4		
Approximate Chi Square Value (.05)	217.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	1.072
Adjusted Chi Square Value	212.8	95% Jackknife UCL	1.082
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.154	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.461	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.26
		97.5% Chebyshev(Mean, Sd) UCL	1.391
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.647
95% Approximate Gamma UCL	1.116		
95% Adjusted Gamma UCL	1.141		

Potential UCL to Use		Use 95% Student's-t UCL	1.082
		or 95% Modified-t UCL	1.082

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options		
From File	567-03.wst	
Full Precision	OFF	
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Chromium

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Chromium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options
 From File 567-04.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 3

Raw Statistics

	Raw Statistics	Log-transformed Statistics	
Minimum	11200	Minimum of Log Data	9.324
Maximum	13400	Maximum of Log Data	9.503
Mean	12300	Mean of log Data	9.417
Median	12300	SD of log Data	0.0366
SD	449.1		
Coefficient of Variation	0.0365		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

	Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.573
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

	Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	12522	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12845
95% Adjusted-CLT UCL (Chen-1995)	12505	97.5% Chebyshev (MVUE) UCL	13081
95% Modified-t UCL (Johnson-1978)	12522	99% Chebyshev (MVUE) UCL	13544

Gamma Distribution Test

	Gamma Distribution Test	Data Distribution	
k star (bias corrected)	622.8	Data do not follow a Discernable Distribution (0.05)	
Theta Star	19.75		
MLE of Mean	12300		
MLE of Standard Deviation	492.9		
nu star	16194		
Approximate Chi Square Value (.05)	15899	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	12505
Adjusted Chi Square Value	15857	95% Jackknife UCL	12522
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.075	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.427	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12843
		97.5% Chebyshev(Mean, Sd) UCL	13078
		99% Chebyshev(Mean, Sd) UCL	13539
Assuming Gamma Distribution			
95% Approximate Gamma UCL	12528		
95% Adjusted Gamma UCL	12561		

Potential UCL to Use Use 95% Student's-t UCL 12522
 or 95% Modified-t UCL 12522

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 3

Raw Statistics

	Log-transformed Statistics	
Minimum	14.2 Minimum of Log Data	2.653
Maximum	17.7 Maximum of Log Data	2.874
Mean	15.95 Mean of log Data	2.769
Median	15.95 SD of log Data	0.045
SD	0.714	
Coefficient of Variation	0.0448	
Skewness	1.78E-14	

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574 Shapiro Wilk Test Statistic	0.573
Shapiro Wilk Critical Value	0.866 Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	16.28	95% Chebyshev (MVUE) UCL	16.82
95% Modified-t UCL (Johnson-1978)	16.3	97.5% Chebyshev (MVUE) UCL	17.19
		99% Chebyshev (MVUE) UCL	17.93

Gamma Distribution Test

k star (bias corrected)	413	Data Distribution	
Theta Star	0.0386	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	15.95		
MLE of Standard Deviation	0.785		
nu star	10739		
Approximate Chi Square Value (.05)	10499	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	16.28
Adjusted Chi Square Value	10465	95% Jackknife UCL	16.3
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.075	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.429	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16.81
		97.5% Chebyshev(Mean, Sd) UCL	17.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.92
95% Approximate Gamma UCL	16.31		
95% Adjusted Gamma UCL	16.37		

Potential UCL to Use Use 95% Student's-t UCL 16.3
 or 95% Modified-t UCL 16.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.264	Minimum of Log Data	-1.332
Maximum	1.57	Maximum of Log Data	0.451
Mean	0.917	Mean of log Data	-0.141
Median	0.917	SD of log Data	0.387
SD	0.267		
Coefficient of Variation	0.291		
Skewness	1.44E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.507
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.049	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.169
95% Adjusted-CLT UCL (Chen-1995)	1.039	95% Chebyshev (MVUE) UCL	1.373
95% Modified-t UCL (Johnson-1978)	1.049	97.5% Chebyshev (MVUE) UCL	1.565
		99% Chebyshev (MVUE) UCL	1.941

Gamma Distribution Test

k star (bias corrected)	7.245	Data Distribution	
Theta Star	0.127	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.917		
MLE of Standard Deviation	0.341		
nu star	188.4		
Approximate Chi Square Value (.05)	157.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	1.039
Adjusted Chi Square Value	153.6	95% Jackknife UCL	1.049
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.183	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.467	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.239
		97.5% Chebyshev(Mean, Sd) UCL	1.379
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.653
95% Approximate Gamma UCL	1.096		
95% Adjusted Gamma UCL	1.124		

Potential UCL to Use		Use 95% Student's-t UCL	1.049
		or 95% Modified-t UCL	1.049

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 14-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Americium-241

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12		4
Raw Statistics		Log-transformed Statistics	
Minimum	-0.003	Log Statistics Not Available	
Maximum	1.65		
Mean	0.549		
Median	0.549		
SD	0.406		
Coefficient of Variation	0.74		
Skewness	1.625		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Not Available	
Shapiro Wilk Test Statistic	0.651		
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.76	95% H-UCL N/A	
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.76	95% Adjusted-CLT UCL (Chen 1995)	0.801
		95% Modified-t UCL (Johnson-1978)	0.769

Gamma Distribution Test		Data Distribution	
Gamma Statistics Not Available		Data do not follow a Discernable Distribution (0.05)	

Potential UCL to Use		95% CLT UCL	
Use 95% Chebyshev (Mean, Sd) UCL	1.061	95% Jackknife UCL	0.742
		95% Standard Bootstrap UCL	0.737
		95% Bootstrap-t UCL	0.825
		95% Hall's Bootstrap UCL	1.838
		95% Percentile Bootstrap UCL	0.733
		95% BCA Bootstrap UCL	0.825
		95% Chebyshev(Mean, Sd) UCL	1.061
		97.5% Chebyshev(Mean, Sd) UCL	1.282
		99% Chebyshev(Mean, Sd) UCL	1.717

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.32	Log-transformed Statistics	
Maximum	9.73	Minimum of Log Data	-1.139
Mean	2.8	Maximum of Log Data	2.275
Median	2.8	Mean of log Data	0.688
SD	2.414	SD of log Data	0.949
Coefficient of Variation	0.862		
Skewness	2.292		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.643	Shapiro Wilk Test Statistic	0.779
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.051	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.01
95% Adjusted-CLT UCL (Chen-1995)	4.439	95% Chebyshev (MVUE) UCL	6.752
95% Modified-t UCL (Johnson-1978)	4.128	97.5% Chebyshev (MVUE) UCL	8.388
		99% Chebyshev (MVUE) UCL	11.6

Gamma Distribution Test

k star (bias corrected)	1.263	Data Distribution	
Theta Star	2.216	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.8		
MLE of Standard Deviation	2.491		
nu star	30.32		
Approximate Chi Square Value (.05)	18.74	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	3.946
Adjusted Chi Square Value	17.37	95% Jackknife UCL	4.051
		95% Standard Bootstrap UCL	3.883

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.745	95% Bootstrap-t UCL	4.748
Kolmogorov-Smirnov Test Statistic	0.355	95% Hall's Bootstrap UCL	9.263
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Percentile Bootstrap UCL	3.955
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	4.343
		95% Chebyshev(Mean, Sd) UCL	5.837
		97.5% Chebyshev(Mean, Sd) UCL	7.151
		99% Chebyshev(Mean, Sd) UCL	9.733

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.529		
95% Adjusted Gamma UCL	4.888		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	5.837
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

Minimum	4.1	Log-transformed Statistics	
Maximum	15.2	Minimum of Log Data	1.411
Mean	9.753	Maximum of Log Data	2.721
Median	10.18	Mean of log Data	2.23
SD	2.883	SD of log Data	0.343
Coefficient of Variation	0.296		
Skewness	-0.223		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.97	Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.25	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.08
95% Adjusted-CLT UCL (Chen-1995)	11.07	95% Chebyshev (MVUE) UCL	14.09
95% Modified-t UCL (Johnson-1978)	11.24	97.5% Chebyshev (MVUE) UCL	15.94
		99% Chebyshev (MVUE) UCL	19.58

Gamma Distribution Test

k star (bias corrected)	7.987	Data Distribution	
Theta Star	1.221	Data appear Normal at 5% Significance Level	
MLE of Mean	9.753		
MLE of Standard Deviation	3.451		
nu star	191.7		
Approximate Chi Square Value (.05)	160.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.12
Adjusted Chi Square Value	156.3	95% Jackknife UCL	11.25
		95% Standard Bootstrap UCL	11.05

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.416	95% Bootstrap-t UCL	11.1
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	11.22
Kolmogorov-Smirnov Test Statistic	0.175	95% Percentile Bootstrap UCL	11.01
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.38
		97.5% Chebyshev(Mean, Sd) UCL	14.95
		99% Chebyshev(Mean, Sd) UCL	18.03

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.64		
95% Adjusted Gamma UCL	11.96		

Potential UCL to Use

Use 95% Student's-t UCL	11.25
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.35	Log-transformed Statistics	
Maximum	1.1	Minimum of Log Data	-1.05
Mean	0.591	Maximum of Log Data	0.0953
Median	0.591	Mean of log Data	-0.56
SD	0.179	SD of log Data	0.266
Coefficient of Variation	0.303		
Skewness	2.143		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.671	Shapiro Wilk Test Statistic	0.768
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.684	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.689
95% Adjusted-CLT UCL (Chen-1995)	0.71	95% Chebyshev (MVUE) UCL	0.789
95% Modified-t UCL (Johnson-1978)	0.689	97.5% Chebyshev (MVUE) UCL	0.875
		99% Chebyshev (MVUE) UCL	1.044

Gamma Distribution Test

k star (bias corrected)	10.99	Data Distribution	
Theta Star	0.0538	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.591		
MLE of Standard Deviation	0.178		
nu star	263.6		
Approximate Chi Square Value (.05)	227	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.676
Adjusted Chi Square Value	221.9	95% Jackknife UCL	0.684

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.584	95% Standard Bootstrap UCL	0.67
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	0.727
Kolmogorov-Smirnov Test Statistic	0.382	95% Hall's Bootstrap UCL	1.099
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	0.676
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	0.707
		95% Chebyshev(Mean, Sd) UCL	0.817
		97.5% Chebyshev(Mean, Sd) UCL	0.914
		99% Chebyshev(Mean, Sd) UCL	1.106

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.687		
95% Adjusted Gamma UCL	0.703		

Potential UCL to Use

Use 95% Student's-t UCL	0.684
or 95% Modified-t UCL	0.689

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

Minimum	12.7	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.542
Mean	55.04	Maximum of Log Data	4.443
Median	54.47	Mean of log Data	3.917
SD	20.43	SD of log Data	0.505
Coefficient of Variation	0.371		
Skewness	-0.314		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Test Statistic	0.814
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	65.63	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	79.11
95% Adjusted-CLT UCL (Chen-1995)	64.17	95% Chebyshev (MVUE) UCL	93.09
95% Modified-t UCL (Johnson-1978)	65.54	97.5% Chebyshev (MVUE) UCL	109
		99% Chebyshev (MVUE) UCL	140.1

Gamma Distribution Test

k star (bias corrected)	4.289	Data Distribution	
Theta Star	12.83	Data appear Normal at 5% Significance Level	
MLE of Mean	55.04		
MLE of Standard Deviation	26.58		
nu star	102.9		
Approximate Chi Square Value (.05)	80.52	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	64.74
Adjusted Chi Square Value	77.5	95% Jackknife UCL	65.63
		95% Standard Bootstrap UCL	64.44

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.495	95% Bootstrap-t UCL	65.64
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	65.29
Kolmogorov-Smirnov Test Statistic	0.197	95% Percentile Bootstrap UCL	64.59
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	64.17
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.75
		97.5% Chebyshev(Mean, Sd) UCL	91.87
		99% Chebyshev(Mean, Sd) UCL	113.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	70.36		
95% Adjusted Gamma UCL	73.1		

Potential UCL to Use

Use 95% Student's-t UCL	65.63
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cobalt-60 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	13320	Log-transformed Statistics	
Maximum	80722	Minimum of Log Data	9.497
Mean	31242	Maximum of Log Data	11.3
Median	31245	Mean of log Data	10.21
SD	18765	SD of log Data	0.539
Coefficient of Variation	0.601		
Skewness	1.738		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.813	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	40970	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	44841
95% Adjusted-CLT UCL (Chen-1995)	43055	95% Chebyshev (MVUE) UCL	52584
95% Modified-t UCL (Johnson-1978)	41423	97.5% Chebyshev (MVUE) UCL	61924
		99% Chebyshev (MVUE) UCL	80272

Gamma Distribution Test

k star (bias corrected)	2.861	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	10921		
MLE of Mean	31242		
MLE of Standard Deviation	18472		
nu star	68.66		
Approximate Chi Square Value (.05)	50.58	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	40152
Adjusted Chi Square Value	48.22	95% Jackknife UCL	40970
		95% Standard Bootstrap UCL	39753
		95% Bootstrap-t UCL	45664
		95% Hall's Bootstrap UCL	81189
		95% Percentile Bootstrap UCL	40267
		95% BCA Bootstrap UCL	42813
		95% Chebyshev(Mean, Sd) UCL	54853
		97.5% Chebyshev(Mean, Sd) UCL	65070
		99% Chebyshev(Mean, Sd) UCL	85139

Anderson-Darling Test Statistic	0.511
Anderson-Darling 5% Critical Value	0.737
Kolmogorov-Smirnov Test Statistic	0.216
Kolmogorov-Smirnov 5% Critical Value	0.247

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	42404
95% Adjusted Gamma UCL	44480

Potential UCL to Use

Use 95% Approximate Gamma UCL 42404

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	185	Log-transformed Statistics	
Maximum	1229	Minimum of Log Data	5.22
Mean	575.5	Maximum of Log Data	7.114
Median	396.1	Mean of log Data	6.143
SD	387.9	SD of log Data	0.685
Coefficient of Variation	0.674		
Skewness	0.751		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.846	Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	776.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	964.6
95% Adjusted-CLT UCL (Chen-1995)	785.7	95% Chebyshev (MVUE) UCL	1091
95% Modified-t UCL (Johnson-1978)	780.7	97.5% Chebyshev (MVUE) UCL	1314
		99% Chebyshev (MVUE) UCL	1753

Gamma Distribution Test

k star (bias corrected)	1.934	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	297.6		
MLE of Mean	575.5		
MLE of Standard Deviation	413.8		
nu star	46.42		
Approximate Chi Square Value (.05)	31.79	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	759.7
Adjusted Chi Square Value	29.95	95% Jackknife UCL	776.7
		95% Standard Bootstrap UCL	754.9

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.523	95% Bootstrap-t UCL	833.1
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	741
Kolmogorov-Smirnov Test Statistic	0.187	95% Percentile Bootstrap UCL	758.9
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	775.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1064
		97.5% Chebyshev(Mean, Sd) UCL	1275
		99% Chebyshev(Mean, Sd) UCL	1690

Assuming Gamma Distribution

95% Approximate Gamma UCL	840.5		
95% Adjusted Gamma UCL	892.1		
Potential UCL to Use		Use 95% Approximate Gamma UCL	840.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.02	Minimum of Log Data	-3.912
Maximum	0.273	Maximum of Log Data	-1.298
Mean	0.186	Mean of log Data	-1.805
Median	0.186	SD of log Data	0.679
SD	0.0614		
Coefficient of Variation	0.33		
Skewness	-1.62		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.656	Shapiro Wilk Test Statistic	0.474
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.218	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.337
95% Adjusted-CLT UCL (Chen-1995)	0.207	95% Chebyshev (MVUE) UCL	0.382
95% Modified-t UCL (Johnson-1978)	0.217	97.5% Chebyshev (MVUE) UCL	0.46
		99% Chebyshev (MVUE) UCL	0.613

Gamma Distribution Test

k star (bias corrected)	3.187	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0585		
MLE of Mean	0.186		
MLE of Standard Deviation	0.104		
nu star	76.5		
Approximate Chi Square Value (.05)	57.35		
Adjusted Level of Significance	0.029		
Adjusted Chi Square Value	54.83		

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.735	Nonparametric Statistics	
Kolmogorov-Smirnov Test Statistic	0.482	95% CLT UCL	0.216
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Jackknife UCL	0.218
Data not Gamma Distributed at 5% Significance Level		95% Standard Bootstrap UCL	0.215
		95% Bootstrap-t UCL	0.212
		95% Hall's Bootstrap UCL	0.209
		95% Percentile Bootstrap UCL	0.214
		95% BCA Bootstrap UCL	0.207
		95% Chebyshev(Mean, Sd) UCL	0.264
		97.5% Chebyshev(Mean, Sd) UCL	0.297
		99% Chebyshev(Mean, Sd) UCL	0.363

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.249
95% Adjusted Gamma UCL	0.26

Potential UCL to Use

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Use 95% Chebyshev (Mean, Sd) UCL 0.264

Nickel

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	65	Minimum of Log Data	4.174
Maximum	1294	Maximum of Log Data	7.165
Mean	270.8	Mean of log Data	5.008
Median	95.92	SD of log Data	1.018
SD	372.6		
Coefficient of Variation	1.376		
Skewness	2.259		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.621	Shapiro Wilk Test Statistic	0.778
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	463.9	95% H-UCL	621.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	561.7
95% Adjusted-CLT UCL (Chen-1995)	522.6	97.5% Chebyshev (MVUE) UCL	702.3
95% Modified-t UCL (Johnson-1978)	475.6	99% Chebyshev (MVUE) UCL	978.4
Gamma Distribution Test			
k star (bias corrected)	0.788	Data do not follow a Discernable Distribution (0.05)	
Theta Star	343.7		
MLE of Mean	270.8		
MLE of Standard Deviation	305.1		
nu star	18.91		
Approximate Chi Square Value (.05)	10.05	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	447.7
Adjusted Chi Square Value	9.078	95% Jackknife UCL	463.9
		95% Standard Bootstrap UCL	445.3
		95% Bootstrap-t UCL	679.4
		95% Hall's Bootstrap UCL	522.7
		95% Percentile Bootstrap UCL	454.2
		95% BCA Bootstrap UCL	520.2
		95% Chebyshev(Mean, Sd) UCL	739.6
		97.5% Chebyshev(Mean, Sd) UCL	942.4
		99% Chebyshev(Mean, Sd) UCL	1341
Assuming Gamma Distribution			
95% Approximate Gamma UCL	509.4		
95% Adjusted Gamma UCL	563.9		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	739.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.33	Minimum of Log Data	-1.109
Maximum	5	Maximum of Log Data	1.609
Mean	3.851	Mean of log Data	0.976
Median	5	SD of log Data	1.149
SD	2.079		
Coefficient of Variation	0.54		
Skewness	-1.328		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.558	Shapiro Wilk Test Statistic	0.573
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.929	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.52
95% Adjusted-CLT UCL (Chen-1995)	4.592	95% Chebyshev (MVUE) UCL	12.14
95% Modified-t UCL (Johnson-1978)	4.89	97.5% Chebyshev (MVUE) UCL	15.35
		99% Chebyshev (MVUE) UCL	21.64

Gamma Distribution Test

k star (bias corrected)	1.172	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.285		
MLE of Mean	3.851		
MLE of Standard Deviation	3.557		
nu star	28.13		
Approximate Chi Square Value (.05)	17.03	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	4.838
Adjusted Chi Square Value	15.72	95% Jackknife UCL	4.929

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	2.853	95% Standard Bootstrap UCL	4.763
Kolmogorov-Smirnov Test Statistic	0.746	95% Bootstrap-t UCL	4.829
Kolmogorov-Smirnov 5% Critical Value	0.477	95% Hall's Bootstrap UCL	4.656
Data not Gamma Distributed at 5% Significance Level	0.25	95% Percentile Bootstrap UCL	4.615
		95% BCA Bootstrap UCL	4.615
		95% Chebyshev(Mean, Sd) UCL	6.467
		97.5% Chebyshev(Mean, Sd) UCL	7.599
		99% Chebyshev(Mean, Sd) UCL	9.823

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.361		
95% Adjusted Gamma UCL	6.889		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	6.467
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	0.031	Log-transformed Statistics	
Maximum	16.69	Minimum of Log Data	-3.474
Mean	8.572	Maximum of Log Data	2.815
Median	10	Mean of log Data	1.296
SD	5.102	SD of log Data	2.257
Coefficient of Variation	0.595		
Skewness	-0.709		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.826	Shapiro Wilk Test Statistic	0.597
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.22	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2004
95% Adjusted-CLT UCL (Chen-1995)	10.67	95% Chebyshev (MVUE) UCL	111.9
95% Modified-t UCL (Johnson-1978)	11.17	97.5% Chebyshev (MVUE) UCL	148.3
		99% Chebyshev (MVUE) UCL	219.7

Gamma Distribution Test

k star (bias corrected)	0.586	Data Distribution	
Theta Star	14.62	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.572		
MLE of Standard Deviation	11.19		
nu star	14.08		
Approximate Chi Square Value (.05)	6.623	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.99
Adjusted Chi Square Value	5.86	95% Jackknife UCL	11.22
		95% Standard Bootstrap UCL	10.9
		95% Bootstrap-t UCL	10.83
		95% Hall's Bootstrap UCL	10.64
		95% Percentile Bootstrap UCL	10.84
		95% BCA Bootstrap UCL	10.48
		95% Chebyshev(Mean, Sd) UCL	14.99
		97.5% Chebyshev(Mean, Sd) UCL	17.77
		99% Chebyshev(Mean, Sd) UCL	23.23

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.769		
Kolmogorov-Smirnov Test Statistic	0.452		
Kolmogorov-Smirnov 5% Critical Value	0.255		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	18.22		
95% Adjusted Gamma UCL	20.59		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	23.23
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.75	Minimum of Log Data	-0.288
Maximum	406	Maximum of Log Data	6.006
Mean	137.6	Mean of log Data	4.322
Median	137.6	SD of log Data	1.748
SD	99.1		
Coefficient of Variation	0.72		
Skewness	1.624		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.653	Shapiro Wilk Test Statistic	0.597
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	189	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3561
95% Adjusted-CLT UCL (Chen-1995)	199	95% Chebyshev (MVUE) UCL	921.2
95% Modified-t UCL (Johnson-1978)	191.3	97.5% Chebyshev (MVUE) UCL	1203
		99% Chebyshev (MVUE) UCL	1756

Gamma Distribution Test

k star (bias corrected)	0.777	Data Distribution	
Theta Star	177.1	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	137.6		
MLE of Standard Deviation	156.2		
nu star	18.65		
Approximate Chi Square Value (.05)	9.861	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	184.7
Adjusted Chi Square Value	8.9	95% Jackknife UCL	189
		95% Standard Bootstrap UCL	183.7

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.758	95% Bootstrap-t UCL	204.7
Kolmogorov-Smirnov Test Statistic	0.468	95% Hall's Bootstrap UCL	452
Kolmogorov-Smirnov 5% Critical Value	0.253	95% Percentile Bootstrap UCL	182.4
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	193.8
		95% Chebyshev(Mean, Sd) UCL	262.3
		97.5% Chebyshev(Mean, Sd) UCL	316.3
		99% Chebyshev(Mean, Sd) UCL	422.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	260.3		
95% Adjusted Gamma UCL	288.4		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	422.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	6.86	Log-transformed Statistics	
Maximum	352.3	Minimum of Log Data	1.926
Mean	90.07	Maximum of Log Data	5.865
Median	22.1	Mean of log Data	3.5
SD	132.2	SD of log Data	1.429
Coefficient of Variation	1.467		
Skewness	1.457		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.65	Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	158.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	462.2
95% Adjusted-CLT UCL (Chen-1995)	170	95% Chebyshev (MVUE) UCL	236.4
95% Modified-t UCL (Johnson-1978)	161.3	97.5% Chebyshev (MVUE) UCL	304.1
		99% Chebyshev (MVUE) UCL	437.3

Gamma Distribution Test

k star (bias corrected)	0.517	Data do not follow a Discernable Distribution (0.05)	
Theta Star	174.2		
MLE of Mean	90.07		
MLE of Standard Deviation	125.3		
nu star	12.41		
Approximate Chi Square Value (.05)	5.498	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	152.8
Adjusted Chi Square Value	4.814	95% Jackknife UCL	158.6
		95% Standard Bootstrap UCL	150.3
Anderson-Darling Test Statistic	1.256	95% Bootstrap-t UCL	205
Anderson-Darling 5% Critical Value	0.776	95% Hall's Bootstrap UCL	138.2
Kolmogorov-Smirnov Test Statistic	0.296	95% Percentile Bootstrap UCL	155.4
Kolmogorov-Smirnov 5% Critical Value	0.257	95% BCA Bootstrap UCL	170.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	256.4
		97.5% Chebyshev(Mean, Sd) UCL	328.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	469.7
95% Approximate Gamma UCL	203.3		
95% Adjusted Gamma UCL	232.2		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	256.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.0113	Minimum of Log Data	-4.483
Maximum	0.287	Maximum of Log Data	-1.248
Mean	0.12	Mean of log Data	-2.302
Median	0.12	SD of log Data	0.763
SD	0.0627		
Coefficient of Variation	0.523		
Skewness	1.418		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.673	Shapiro Wilk Test Statistic	0.622
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.152	95% H-UCL	0.238
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.261
95% Adjusted-CLT UCL (Chen-1995)	0.157	97.5% Chebyshev (MVUE) UCL	0.317
95% Modified-t UCL (Johnson-1978)	0.153	99% Chebyshev (MVUE) UCL	0.428
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.255	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0531		
MLE of Mean	0.12	Nonparametric Statistics	
MLE of Standard Deviation	0.0798	95% CLT UCL	0.15
nu star	54.11	95% Jackknife UCL	0.152
Approximate Chi Square Value (.05)	38.21	95% Standard Bootstrap UCL	0.149
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	0.16
Adjusted Chi Square Value	36.18	95% Hall's Bootstrap UCL	0.329
Anderson-Darling Test Statistic	2.09	95% Percentile Bootstrap UCL	0.153
Anderson-Darling 5% Critical Value	0.739	95% BCA Bootstrap UCL	0.157
Kolmogorov-Smirnov Test Statistic	0.411	95% Chebyshev(Mean, Sd) UCL	0.199
Kolmogorov-Smirnov 5% Critical Value	0.247	97.5% Chebyshev(Mean, Sd) UCL	0.233
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	0.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.17		
95% Adjusted Gamma UCL	0.179		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.199

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.121	Minimum of Log Data	-2.112
Maximum	9.14	Maximum of Log Data	2.213
Mean	3.65	Mean of log Data	1.023
Median	3.65	SD of log Data	1.051
SD	2.055		
Coefficient of Variation	0.563		
Skewness	1.433		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.673	Shapiro Wilk Test Statistic	0.566
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.715	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.55
95% Adjusted-CLT UCL (Chen-1995)	4.888	95% Chebyshev (MVUE) UCL	10.97
95% Modified-t UCL (Johnson-1978)	4.756	97.5% Chebyshev (MVUE) UCL	13.76
		99% Chebyshev (MVUE) UCL	19.23

Gamma Distribution Test

k star (bias corrected)	1.549	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.356		
MLE of Mean	3.65		
MLE of Standard Deviation	2.933		
nu star	37.18		
Approximate Chi Square Value (.05)	24.22	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	4.626
Adjusted Chi Square Value	22.64	95% Jackknife UCL	4.715
		95% Standard Bootstrap UCL	4.607

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.213	95% Bootstrap-t UCL	4.962
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	10.48
Kolmogorov-Smirnov Test Statistic	0.428	95% Percentile Bootstrap UCL	4.696
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	4.859
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.236
		97.5% Chebyshev(Mean, Sd) UCL	7.354
		99% Chebyshev(Mean, Sd) UCL	9.552

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.603
95% Adjusted Gamma UCL	5.996

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	6.236
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	6.75	Log-transformed Statistics	
Maximum	50.2	Minimum of Log Data	1.91
Mean	25.01	Maximum of Log Data	3.916
Median	25.01	Mean of log Data	3.143
SD	9.505	SD of log Data	0.445
Coefficient of Variation	0.38		
Skewness	1.243		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.672	Shapiro Wilk Test Statistic	0.647
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	29.94	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	33.82
95% Adjusted-CLT UCL (Chen-1995)	30.58	95% Chebyshev (MVUE) UCL	39.85
95% Modified-t UCL (Johnson-1978)	30.1	97.5% Chebyshev (MVUE) UCL	46.12
		99% Chebyshev (MVUE) UCL	58.43

Gamma Distribution Test

k star (bias corrected)	5.105	Data Distribution	
Theta Star	4.899	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	25.01		
MLE of Standard Deviation	11.07		
nu star	122.5		
Approximate Chi Square Value (.05)	97.97	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	29.53
Adjusted Chi Square Value	94.62	95% Jackknife UCL	29.94
		95% Standard Bootstrap UCL	29.35

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	2.053	95% Bootstrap-t UCL	30.89
Kolmogorov-Smirnov Test Statistic	0.731	95% Hall's Bootstrap UCL	56.61
Kolmogorov-Smirnov 5% Critical Value	0.365	95% Percentile Bootstrap UCL	29.42
Data not Gamma Distributed at 5% Significance Level	0.246	95% BCA Bootstrap UCL	29.79
		95% Chebyshev(Mean, Sd) UCL	36.97
		97.5% Chebyshev(Mean, Sd) UCL	42.15
		99% Chebyshev(Mean, Sd) UCL	52.31

Assuming Gamma Distribution

95% Approximate Gamma UCL	31.28		
95% Adjusted Gamma UCL	32.39		

Potential UCL to Use

Use 95% Student's-t UCL	29.94
or 95% Modified-t UCL	30.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

14-02.wst
 OFF
 95%
 2000

Aluminum

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	5190	Log-transformed Statistics	
Maximum	13100	Minimum of Log Data	8.554
Mean	9145	Maximum of Log Data	9.48
Median	9145	Mean of log Data	9.104
SD	1686	SD of log Data	0.201
Coefficient of Variation	0.184		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.576
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10019	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10260
95% Adjusted-CLT UCL (Chen-1995)	9946	95% Chebyshev (MVUE) UCL	11488
95% Modified-t UCL (Johnson-1978)	10019	97.5% Chebyshev (MVUE) UCL	12497
		99% Chebyshev (MVUE) UCL	14478

Gamma Distribution Test

k star (bias corrected)	21.91	Data Distribution	
Theta Star	417.4	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9145		
MLE of Standard Deviation	1954		
nu star	525.9		
Approximate Chi Square Value (.05)	473.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9946
Adjusted Chi Square Value	466.1	95% Jackknife UCL	10019

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.746	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.441	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	11267
		97.5% Chebyshev(Mean, Sd) UCL	12185
		99% Chebyshev(Mean, Sd) UCL	13989

Assuming Gamma Distribution

95% Approximate Gamma UCL	10152		
95% Adjusted Gamma UCL	10317		

Potential UCL to Use

Use 95% Student's-t UCL 10019
 or 95% Modified-t UCL 10019

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	3.2	Minimum of Log Data	1.163
Maximum	3.7	Maximum of Log Data	1.308
Mean	3.45	Mean of log Data	1.238
Median	3.45	SD of log Data	0.031
SD	0.107		
Coefficient of Variation	0.0309		
Skewness	-2E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	3.505	95% H-UCL N/A	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.584
95% Adjusted-CLT UCL (Chen-1995)	3.501	97.5% Chebyshev (MVUE) UCL	3.643
95% Modified-t UCL (Johnson-1978)	3.505	99% Chebyshev (MVUE) UCL	3.757
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	854.9	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00404		
MLE of Mean	3.45	Nonparametric Statistics	
MLE of Standard Deviation	0.118	95% CLT UCL	3.501
nu star	20518	95% Jackknife UCL	3.505
Approximate Chi Square Value (.05)	20186	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	20135	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.714	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.419	95% Chebyshev(Mean, Sd) UCL	3.584
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	3.642
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	3.756
Assuming Gamma Distribution			
95% Approximate Gamma UCL	3.507		
95% Adjusted Gamma UCL	3.516		
Potential UCL to Use		Use 95% Student's-t UCL	3.505
		or 95% Modified-t UCL	3.505

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	6.38	Minimum of Log Data	1.853
Maximum	25.82	Maximum of Log Data	3.251
Mean	11.48	Mean of log Data	2.348
Median	9.34	SD of log Data	0.431
SD	5.736		
Coefficient of Variation	0.5		
Skewness	1.622		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.817	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	14.46	95% H-UCL	15
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	17.67
95% Adjusted-CLT UCL (Chen-1995)	15.04	97.5% Chebyshev (MVUE) UCL	20.38
95% Modified-t UCL (Johnson-1978)	14.59	99% Chebyshev (MVUE) UCL	25.72
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.203	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	2.732		
MLE of Mean	11.48		
MLE of Standard Deviation	5.601		
nu star	100.9		
Approximate Chi Square Value (.05)	78.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	14.21
Adjusted Chi Square Value	75.72	95% Jackknife UCL	14.46
Anderson-Darling Test Statistic	0.569	95% Standard Bootstrap UCL	14.07
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	16.41
Kolmogorov-Smirnov Test Statistic	0.22	95% Hall's Bootstrap UCL	16.57
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	14.31
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	14.92
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	18.7
95% Approximate Gamma UCL	14.72	97.5% Chebyshev(Mean, Sd) UCL	21.82
95% Adjusted Gamma UCL	15.3	99% Chebyshev(Mean, Sd) UCL	27.96
Potential UCL to Use		Use 95% Approximate Gamma UCL	14.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.62	Minimum of Log Data	-0.478
Maximum	0.71	Maximum of Log Data	-0.342
Mean	0.665	Mean of log Data	-0.408
Median	0.665	SD of log Data	0.0289
SD	0.0192		
Coefficient of Variation	0.0289		
Skewness	-1E-14		

Warning: There are only 3 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.675	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	0.674	95% Chebyshev (MVUE) UCL	0.689
95% Modified-t UCL (Johnson-1978)	0.675	97.5% Chebyshev (MVUE) UCL	0.7
		99% Chebyshev (MVUE) UCL	0.72

Gamma Distribution Test

k star (bias corrected)	980.7	Data Distribution	
Theta Star	0.00068	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.665		
MLE of Standard Deviation	0.0212		
nu star	23536		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.029	Nonparametric Statistics	
Adjusted Chi Square Value	23126	95% CLT UCL	0.674
		95% Jackknife UCL	0.675

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.417	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.675	95% Chebyshev(Mean, Sd) UCL	0.689
95% Adjusted Gamma UCL	0.677	97.5% Chebyshev(Mean, Sd) UCL	0.7
		99% Chebyshev(Mean, Sd) UCL	0.72

Potential UCL to Use

Use 95% Student's-t UCL	0.675
or 95% Modified-t UCL	0.675

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.73	Minimum of Log Data	-0.315
Maximum	2.4	Maximum of Log Data	0.875
Mean	1.565	Mean of log Data	0.42
Median	1.565	SD of log Data	0.262
SD	0.356		
Coefficient of Variation	0.228		
Skewness	-2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.562
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.75	95% H-UCL	1.829
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.092
95% Adjusted-CLT UCL (Chen-1995)	1.734	97.5% Chebyshev (MVUE) UCL	2.317
95% Modified-t UCL (Johnson-1978)	1.75	99% Chebyshev (MVUE) UCL	2.761
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	13.61	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.115		
MLE of Mean	1.565	Nonparametric Statistics	
MLE of Standard Deviation	0.424	95% CLT UCL	1.734
nu star	326.7	95% Jackknife UCL	1.75
Approximate Chi Square Value (.05)	285.8	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	280	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.766	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.448	95% Chebyshev(Mean, Sd) UCL	2.013
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	2.207
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	2.588
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.789		
95% Adjusted Gamma UCL	1.826		
Potential UCL to Use		Use 95% Student's-t UCL	1.75
		or 95% Modified-t UCL	1.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	36.91	Minimum of Log Data	3.608
Maximum	98.88	Maximum of Log Data	4.594
Mean	61.28	Mean of log Data	4.059
Median	60.16	SD of log Data	0.353
SD	21.36		
Coefficient of Variation	0.348		
Skewness	0.387		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	72.35	95% H-UCL	76.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	88.85
95% Adjusted-CLT UCL (Chen-1995)	72.16	97.5% Chebyshev (MVUE) UCL	100.8
95% Modified-t UCL (Johnson-1978)	72.47	99% Chebyshev (MVUE) UCL	124.2
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.812	Data appear Normal at 5% Significance Level	
Theta Star	8.997		
MLE of Mean	61.28		
MLE of Standard Deviation	23.48		
nu star	163.5		
Approximate Chi Square Value (.05)	134.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	71.42
Adjusted Chi Square Value	131	95% Jackknife UCL	72.35
Anderson-Darling Test Statistic	0.424	95% Standard Bootstrap UCL	71.31
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	73.75
Kolmogorov-Smirnov Test Statistic	0.167	95% Hall's Bootstrap UCL	70.97
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	71.21
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	71.31
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	88.15
95% Approximate Gamma UCL	74.26	97.5% Chebyshev(Mean, Sd) UCL	99.78
95% Adjusted Gamma UCL	76.5	99% Chebyshev(Mean, Sd) UCL	122.6
Potential UCL to Use		Use 95% Student's-t UCL	72.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	24.29	Minimum of Log Data	3.19
Maximum	258.3	Maximum of Log Data	5.554
Mean	149.4	Mean of log Data	4.763
Median	159.2	SD of log Data	0.848
SD	82.42		
Coefficient of Variation	0.552		
Skewness	-0.4		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level		Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	
95% Student's-t UCL	192.1	95% Chebyshev (MVUE) UCL	343.4
95% UCLs (Adjusted for Skewness)		97.5% Chebyshev (MVUE) UCL	422.2
95% Adjusted-CLT UCL (Chen-1995)	185.6	99% Chebyshev (MVUE) UCL	576.8
95% Modified-t UCL (Johnson-1978)	191.7		
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.709	Data appear Normal at 5% Significance Level	
Theta Star	87.4		
MLE of Mean	149.4		
MLE of Standard Deviation	114.3		
nu star	41.02		
Approximate Chi Square Value (.05)	27.34	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	
Adjusted Chi Square Value	25.65	95% Jackknife UCL	
		95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic	0.831	95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic	0.239	95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	
		97.5% Chebyshev(Mean, Sd) UCL	
		99% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution			
95% Approximate Gamma UCL	224.1		
95% Adjusted Gamma UCL	238.9		
Potential UCL to Use		Use 95% Student's-t UCL	192.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	22763	Log-transformed Statistics	
Maximum	61312	Minimum of Log Data	10.03
Mean	37892	Maximum of Log Data	11.02
Median	36336	Mean of log Data	10.5
SD	11330	SD of log Data	0.289
Coefficient of Variation	0.299		
Skewness	0.817		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Test Statistic	0.982
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	43766	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	44921
95% Adjusted-CLT UCL (Chen-1995)	44096	95% Chebyshev (MVUE) UCL	51770
95% Modified-t UCL (Johnson-1978)	43894	97.5% Chebyshev (MVUE) UCL	57787
		99% Chebyshev (MVUE) UCL	69606

Gamma Distribution Test

k star (bias corrected)	9.788	Data Distribution	
Theta Star	3871	Data appear Normal at 5% Significance Level	
MLE of Mean	37892		
MLE of Standard Deviation	12111		
nu star	234.9		
Approximate Chi Square Value (.05)	200.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	43272
Adjusted Chi Square Value	195.6	95% Jackknife UCL	43766
		95% Standard Bootstrap UCL	42914
		95% Bootstrap-t UCL	45608
		95% Hall's Bootstrap UCL	44676
		95% Percentile Bootstrap UCL	43218
		95% BCA Bootstrap UCL	43811
		95% Chebyshev(Mean, Sd) UCL	52149
		97.5% Chebyshev(Mean, Sd) UCL	58318
		99% Chebyshev(Mean, Sd) UCL	70436

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.124		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	44410		
95% Adjusted Gamma UCL	45514		

Potential UCL to Use

Use 95% Student's-t UCL 43766

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	250.4	Log-transformed Statistics	
Maximum	2668	Minimum of Log Data	5.523
Mean	1110	Maximum of Log Data	7.889
Median	931.5	Mean of log Data	6.789
SD	769.1	SD of log Data	0.716
Coefficient of Variation	0.693		
Skewness	1.056		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.888	Shapiro Wilk Test Statistic	0.977
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1509	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1941
95% Adjusted-CLT UCL (Chen-1995)	1548	95% Chebyshev (MVUE) UCL	2169
95% Modified-t UCL (Johnson-1978)	1520	97.5% Chebyshev (MVUE) UCL	2623
		99% Chebyshev (MVUE) UCL	3516

Gamma Distribution Test

k star (bias corrected)	1.847	Data Distribution	
Theta Star	601.2	Data appear Normal at 5% Significance Level	
MLE of Mean	1110		
MLE of Standard Deviation	817.1		
nu star	44.33		
Approximate Chi Square Value (.05)	30.06	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1476
Adjusted Chi Square Value	28.27	95% Jackknife UCL	1509

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.205	95% Standard Bootstrap UCL	1467
Kolmogorov-Smirnov Test Statistic	0.741	95% Bootstrap-t UCL	1679
Kolmogorov-Smirnov 5% Critical Value	0.128	95% Hall's Bootstrap UCL	1790
Data appear Gamma Distributed at 5% Significance Level	0.248	95% Percentile Bootstrap UCL	1455
		95% BCA Bootstrap UCL	1496
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	2078
95% Approximate Gamma UCL	1638	97.5% Chebyshev(Mean, Sd) UCL	2497
95% Adjusted Gamma UCL	1741	99% Chebyshev(Mean, Sd) UCL	3320

Potential UCL to Use

Use 95% Student's-t UCL	1509
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.267	Minimum of Log Data	-1.321
Maximum	10	Maximum of Log Data	2.303
Mean	8.3	Mean of log Data	1.732
Median	10	SD of log Data	1.31
SD	3.724		
Coefficient of Variation	0.449		
Skewness	-2.024		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.504	Shapiro Wilk Test Statistic	0.491
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.23	95% H-UCL	53.34
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	33.29
95% Adjusted-CLT UCL (Chen-1995)	9.397	97.5% Chebyshev (MVUE) UCL	42.55
95% Modified-t UCL (Johnson-1978)	10.13	99% Chebyshev (MVUE) UCL	60.72
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.139	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.286		
MLE of Mean	8.3		
MLE of Standard Deviation	7.776		
nu star	27.34		
Approximate Chi Square Value (.05)	16.41	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.07
Adjusted Chi Square Value	15.13	95% Jackknife UCL	10.23
Anderson-Darling Test Statistic	3.348	95% Standard Bootstrap UCL	9.964
Anderson-Darling 5% Critical Value	0.747	95% Bootstrap-t UCL	9.662
Kolmogorov-Smirnov Test Statistic	0.474	95% Hall's Bootstrap UCL	9.472
Kolmogorov-Smirnov 5% Critical Value	0.25	95% Percentile Bootstrap UCL	9.907
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.204
		95% Chebyshev(Mean, Sd) UCL	12.99
		97.5% Chebyshev(Mean, Sd) UCL	15.01
		99% Chebyshev(Mean, Sd) UCL	19
Assuming Gamma Distribution			
95% Approximate Gamma UCL	13.82		
95% Adjusted Gamma UCL	14.99		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	12.99
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.77	Minimum of Log Data	-0.261
Maximum	2.29	Maximum of Log Data	0.829
Mean	1.53	Mean of log Data	0.402
Median	1.53	SD of log Data	0.239
SD	0.324		
Coefficient of Variation	0.212		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.568
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.698	95% H-UCL	1.76
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.997
95% Adjusted-CLT UCL (Chen-1995)	1.684	97.5% Chebyshev (MVUE) UCL	2.198
95% Modified-t UCL (Johnson-1978)	1.698	99% Chebyshev (MVUE) UCL	2.592
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	16.06	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0953		
MLE of Mean	1.53		
MLE of Standard Deviation	0.382		
nu star	385.5		
Approximate Chi Square Value (.05)	341	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.684
Adjusted Chi Square Value	334.6	95% Jackknife UCL	1.698
Anderson-Darling Test Statistic	2.758	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.445	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	1.938
95% Approximate Gamma UCL	1.73	97.5% Chebyshev(Mean, Sd) UCL	2.114
95% Adjusted Gamma UCL	1.763	99% Chebyshev(Mean, Sd) UCL	2.461
Potential UCL to Use		Use 95% Student's-t UCL	1.698
		or 95% Modified-t UCL	1.698

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	260.6	Minimum of Log Data	5.563
Maximum	1381	Maximum of Log Data	7.231
Mean	607.1	Mean of log Data	6.25
Median	407.8	SD of log Data	0.582
SD	364		
Coefficient of Variation	0.6		
Skewness	0.912		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	795.8	95% H-UCL	910
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1060
95% Adjusted-CLT UCL (Chen-1995)	809.5	97.5% Chebyshev (MVUE) UCL	1257
95% Modified-t UCL (Johnson-1978)	800.4	99% Chebyshev (MVUE) UCL	1644
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.543	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	238.7		
MLE of Mean	607.1		
MLE of Standard Deviation	380.7		
nu star	61.04		
Approximate Chi Square Value (.05)	44.07	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	779.9
Adjusted Chi Square Value	41.88	95% Jackknife UCL	795.8
Anderson-Darling Test Statistic	0.762	95% Standard Bootstrap UCL	775.9
Anderson-Darling 5% Critical Value	0.738	95% Bootstrap-t UCL	823.9
Kolmogorov-Smirnov Test Statistic	0.236	95% Hall's Bootstrap UCL	796.4
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	781.1
Data follow Appr. Gamma Distribution at 5% Significance Level		95% BCA Bootstrap UCL	795.7
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	1065
95% Approximate Gamma UCL	840.8	97.5% Chebyshev(Mean, Sd) UCL	1263
95% Adjusted Gamma UCL	884.8	99% Chebyshev(Mean, Sd) UCL	1653
Potential UCL to Use		Use 95% Approximate Gamma UCL	840.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.39	Minimum of Log Data	-0.942
Maximum	5	Maximum of Log Data	1.609
Mean	4.591	Mean of log Data	1.392
Median	5	SD of log Data	0.735
SD	1.326		
Coefficient of Variation	0.289		
Skewness	-3.439		

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 Those methods will return a 'N/A' value on your output display!

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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.356	Shapiro Wilk Test Statistic	0.338
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	5.278	95% H-UCL	9.103
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.09
95% Adjusted-CLT UCL (Chen-1995)	4.814	97.5% Chebyshev (MVUE) UCL	12.23
95% Modified-t UCL (Johnson-1978)	5.215	99% Chebyshev (MVUE) UCL	16.45
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.008	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.526		
MLE of Mean	4.591	Nonparametric Statistics	
MLE of Standard Deviation	2.647	95% CLT UCL	5.22
nu star	72.19	95% Jackknife UCL	5.278
Approximate Chi Square Value (.05)	53.62	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	51.19	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.001	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.736	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.502	95% Chebyshev(Mean, Sd) UCL	6.259
Kolmogorov-Smirnov 5% Critical Value	0.246	97.5% Chebyshev(Mean, Sd) UCL	6.981
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	8.399
Assuming Gamma Distribution			
95% Approximate Gamma UCL	6.18		
95% Adjusted Gamma UCL	6.474		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	6.259
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1.5	Minimum of Log Data	0.405
Maximum	30.65	Maximum of Log Data	3.423
Mean	19.35	Mean of log Data	2.815
Median	20	SD of log Data	0.769
SD	6.4		
Coefficient of Variation	0.331		
Skewness	-1.763		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.565	Shapiro Wilk Test Statistic	0.42
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	22.66	95% H-UCL	40.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	43.87
95% Adjusted-CLT UCL (Chen-1995)	21.38	97.5% Chebyshev (MVUE) UCL	53.43
95% Modified-t UCL (Johnson-1978)	22.51	99% Chebyshev (MVUE) UCL	72.21
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.725	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.1		
MLE of Mean	19.35		
MLE of Standard Deviation	11.72		
nu star	65.39		
Approximate Chi Square Value (.05)	47.79	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	22.38
Adjusted Chi Square Value	45.5	95% Jackknife UCL	22.66
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.285	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.512	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27.4
		97.5% Chebyshev(Mean, Sd) UCL	30.88
		99% Chebyshev(Mean, Sd) UCL	37.73
Assuming Gamma Distribution			
95% Approximate Gamma UCL	26.47		
95% Adjusted Gamma UCL	27.81		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	27.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.72	Minimum of Log Data	-0.329
Maximum	10	Maximum of Log Data	2.303
Mean	8.458	Mean of log Data	1.903
Median	10	SD of log Data	0.93
SD	3.506		
Coefficient of Variation	0.415		
Skewness	-2.054		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.486	Shapiro Wilk Test Statistic	0.489
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.28	95% H-UCL	22.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22.11
95% Adjusted-CLT UCL (Chen-1995)	9.482	97.5% Chebyshev (MVUE) UCL	27.41
95% Modified-t UCL (Johnson-1978)	10.18	99% Chebyshev (MVUE) UCL	37.83
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.786	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.736		
MLE of Mean	8.458		
MLE of Standard Deviation	6.329		
nu star	42.86		
Approximate Chi Square Value (.05)	28.85	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.12
Adjusted Chi Square Value	27.11	95% Jackknife UCL	10.28
Anderson-Darling Test Statistic	3.342	95% Standard Bootstrap UCL	10.05
Anderson-Darling 5% Critical Value	0.741	95% Bootstrap-t UCL	9.686
Kolmogorov-Smirnov Test Statistic	0.493	95% Hall's Bootstrap UCL	9.513
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Percentile Bootstrap UCL	9.93
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.267
		95% Chebyshev(Mean, Sd) UCL	12.87
		97.5% Chebyshev(Mean, Sd) UCL	14.78
		99% Chebyshev(Mean, Sd) UCL	18.53
Assuming Gamma Distribution			
95% Approximate Gamma UCL	12.57		
95% Adjusted Gamma UCL	13.37		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	12.87
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	5.98	Minimum of Log Data	1.788
Maximum	8.8	Maximum of Log Data	2.175
Mean	7.39	Mean of log Data	1.997
Median	7.39	SD of log Data	0.0827
SD	0.601		
Coefficient of Variation	0.0814		
Skewness	2.2E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.595
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.702	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	7.675	95% Chebyshev (MVUE) UCL	8.16
95% Modified-t UCL (Johnson-1978)	7.702	97.5% Chebyshev (MVUE) UCL	8.493
		99% Chebyshev (MVUE) UCL	9.147

Gamma Distribution Test

k star (bias corrected)	121.5	Data Distribution	
Theta Star	0.0608	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.39		
MLE of Standard Deviation	0.67		
nu star	2917		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.029	Nonparametric Statistics	
Adjusted Chi Square Value	2774	95% CLT UCL	7.675
		95% Jackknife UCL	7.702

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.427	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.719	95% BCA Bootstrap UCL	N/A
95% Adjusted Gamma UCL	7.771	95% Chebyshev(Mean, Sd) UCL	8.147
		97.5% Chebyshev(Mean, Sd) UCL	8.474
		99% Chebyshev(Mean, Sd) UCL	9.117

Potential UCL to Use

Use 95% Student's-t UCL	7.702
or 95% Modified-t UCL	7.702

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0639	Minimum of Log Data	-2.75
Maximum	0.338	Maximum of Log Data	-1.084
Mean	0.201	Mean of log Data	-1.656
Median	0.201	SD of log Data	0.375
SD	0.0585		
Coefficient of Variation	0.291		
Skewness	1.7E-15		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.536
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.231	95% H-UCL	0.257
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.301
95% Adjusted-CLT UCL (Chen-1995)	0.229	97.5% Chebyshev (MVUE) UCL	0.343
95% Modified-t UCL (Johnson-1978)	0.231	99% Chebyshev (MVUE) UCL	0.426
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	7.372	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0273		
MLE of Mean	0.201	Nonparametric Statistics	
MLE of Standard Deviation	0.074	95% CLT UCL	0.229
nu star	176.9	95% Jackknife UCL	0.231
Approximate Chi Square Value (.05)	147.2	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	143	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.812	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.459	95% Chebyshev(Mean, Sd) UCL	0.275
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	0.306
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	0.369
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.242		
95% Adjusted Gamma UCL	0.249		
Potential UCL to Use		Use 95% Student's-t UCL	0.231
		or 95% Modified-t UCL	0.231

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	21.54	Minimum of Log Data	3.07
Maximum	524.2	Maximum of Log Data	6.262
Mean	269.2	Mean of log Data	5.237
Median	316.9	SD of log Data	1.027
SD	183.4		
Coefficient of Variation	0.681		
Skewness	-0.0757		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	364.3	95% H-UCL	797.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	715.3
95% Adjusted-CLT UCL (Chen-1995)	355.1	97.5% Chebyshev (MVUE) UCL	895
95% Modified-t UCL (Johnson-1978)	364.1	99% Chebyshev (MVUE) UCL	1248
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.211	Data appear Normal at 5% Significance Level	
Theta Star	222.3		
MLE of Mean	269.2		
MLE of Standard Deviation	244.6		
nu star	29.07		
Approximate Chi Square Value (.05)	17.76	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	356.3
Adjusted Chi Square Value	16.43	95% Jackknife UCL	364.3
Anderson-Darling Test Statistic	0.692	95% Standard Bootstrap UCL	350
Anderson-Darling 5% Critical Value	0.745	95% Bootstrap-t UCL	364.8
Kolmogorov-Smirnov Test Statistic	0.255	95% Hall's Bootstrap UCL	346.8
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Percentile Bootstrap UCL	359.1
Data follow Appr. Gamma Distribution at 5% Significance Level		95% BCA Bootstrap UCL	352.7
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	500
95% Approximate Gamma UCL	440.6	97.5% Chebyshev(Mean, Sd) UCL	599.8
95% Adjusted Gamma UCL	476.5	99% Chebyshev(Mean, Sd) UCL	796
Potential UCL to Use		Use 95% Student's-t UCL	364.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	32.4	Minimum of Log Data	3.478
Maximum	58.1	Maximum of Log Data	4.062
Mean	45.25	Mean of log Data	3.805
Median	45.25	SD of log Data	0.126
SD	5.479		
Coefficient of Variation	0.121		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.589
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	48.09	95% H-UCL	48.47
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	52.42
95% Adjusted-CLT UCL (Chen-1995)	47.85	97.5% Chebyshev (MVUE) UCL	55.52
95% Modified-t UCL (Johnson-1978)	48.09	99% Chebyshev (MVUE) UCL	61.61
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	53.7	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.843		
MLE of Mean	45.25	Nonparametric Statistics	
MLE of Standard Deviation	6.175	95% CLT UCL	47.85
nu star	1289	95% Jackknife UCL	48.09
Approximate Chi Square Value (.05)	1206	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	1194	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.727	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.432	95% Chebyshev(Mean, Sd) UCL	52.14
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	55.13
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	60.99
Assuming Gamma Distribution			
95% Approximate Gamma UCL	48.34		
95% Adjusted Gamma UCL	48.83		
Potential UCL to Use		Use 95% Student's-t UCL	48.09
		or 95% Modified-t UCL	48.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	2	Minimum of Log Data	0.693
Maximum	4.31	Maximum of Log Data	1.461
Mean	3.155	Mean of log Data	1.137
Median	3.155	SD of log Data	0.166
SD	0.492		
Coefficient of Variation	0.156		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.582
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	3.41	95% H-UCL	3.462
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.819
95% Adjusted-CLT UCL (Chen-1995)	3.389	97.5% Chebyshev (MVUE) UCL	4.105
95% Modified-t UCL (Johnson-1978)	3.41	99% Chebyshev (MVUE) UCL	4.667
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	31.45	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.1		
MLE of Mean	3.155	Nonparametric Statistics	
MLE of Standard Deviation	0.563	95% CLT UCL	3.389
nu star	754.9	95% Jackknife UCL	3.41
Approximate Chi Square Value (.05)	692.1	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	683	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.736	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.437	95% Chebyshev(Mean, Sd) UCL	3.775
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	4.043
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	4.57
Assuming Gamma Distribution			
95% Approximate Gamma UCL	3.441		
95% Adjusted Gamma UCL	3.487		
Potential UCL to Use		Use 95% Student's-t UCL	3.41
		or 95% Modified-t UCL	3.41

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	56.1	Minimum of Log Data	4.027
Maximum	111	Maximum of Log Data	4.71
Mean	83.55	Mean of log Data	4.416
Median	83.55	SD of log Data	0.147
SD	11.7		
Coefficient of Variation	0.14		
Skewness	5.4E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.586
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	89.62	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	90.64
95% Adjusted-CLT UCL (Chen-1995)	89.11	95% Chebyshev (MVUE) UCL	99.1
95% Modified-t UCL (Johnson-1978)	89.62	97.5% Chebyshev (MVUE) UCL	105.8
		99% Chebyshev (MVUE) UCL	119

Gamma Distribution Test

k star (bias corrected) 39.58 Data do not follow a Discernable Distribution (0.05)

Theta Star	2.111		
MLE of Mean	83.55		
MLE of Standard Deviation	13.28		
nu star	949.8		
Approximate Chi Square Value (.05)	879.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	89.11
Adjusted Chi Square Value	868.9	95% Jackknife UCL	89.62
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	98.28
		97.5% Chebyshev(Mean, Sd) UCL	104.7
		99% Chebyshev(Mean, Sd) UCL	117.2

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.73		
Kolmogorov-Smirnov Test Statistic	0.435		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	90.25		
95% Adjusted Gamma UCL	91.33		

Potential UCL to Use

Use 95% Student's-t UCL	89.62
or 95% Modified-t UCL	89.62

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options			
From File		14-03.wst	
Full Precision		OFF	
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	6.95	Minimum of Log Data	1.939
Maximum	44.8	Maximum of Log Data	3.802
Mean	13.77	Mean of log Data	2.465
Median	10.47	SD of log Data	0.526
SD	10.37		
Coefficient of Variation	0.753		
Skewness	2.809		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	19.14	95% H-UCL	19.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22.38
95% Adjusted-CLT UCL (Chen-1995)	21.28	97.5% Chebyshev (MVUE) UCL	26.3
95% Modified-t UCL (Johnson-1978)	19.55	99% Chebyshev (MVUE) UCL	33.99
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.556	ata Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	5.386		
MLE of Mean	13.77		
MLE of Standard Deviation	8.611		
nu star	61.35		
Approximate Chi Square Value (.05)	44.33	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	18.69
Adjusted Chi Square Value	42.13	95% Jackknife UCL	19.14
		95% Standard Bootstrap UCL	18.55
Anderson-Darling Test Statistic	0.849	95% Bootstrap-t UCL	26.68
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	37.34
Kolmogorov-Smirnov Test Statistic	0.204	95% Percentile Bootstrap UCL	19.18
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	21.6
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	26.82
		97.5% Chebyshev(Mean, Sd) UCL	32.46
		99% Chebyshev(Mean, Sd) UCL	43.55
Assuming Gamma Distribution			
95% Approximate Gamma UCL	19.05		
95% Adjusted Gamma UCL	20.05		
Potential UCL to Use		Use 95% Approximate Gamma UCL	19.05
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.62	Minimum of Log Data	-0.478
Maximum	3	Maximum of Log Data	1.099
Mean	1.81	Mean of log Data	0.546
Median	1.81	SD of log Data	0.354
SD	0.507		
Coefficient of Variation	0.28		
Skewness	7.42E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.541
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.073	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.27
95% Adjusted-CLT UCL (Chen-1995)	2.051	95% Chebyshev (MVUE) UCL	2.652
95% Modified-t UCL (Johnson-1978)	2.073	97.5% Chebyshev (MVUE) UCL	3.008
		99% Chebyshev (MVUE) UCL	3.709

Gamma Distribution Test

k star (bias corrected)	8.128	Data Distribution	
Theta Star	0.223	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.81		
MLE of Standard Deviation	0.635		
nu star	195.1		
Approximate Chi Square Value (.05)	163.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	2.051
Adjusted Chi Square Value	159.4	95% Jackknife UCL	2.073
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.802	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.448
		97.5% Chebyshev(Mean, Sd) UCL	2.725
		99% Chebyshev(Mean, Sd) UCL	3.267
Assuming Gamma Distribution			
95% Approximate Gamma UCL	2.156		
95% Adjusted Gamma UCL	2.215		

Potential UCL to Use

Use 95% Student's-t UCL	2.073
or 95% Modified-t UCL	2.073

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	25	Minimum of Log Data	3.219
Maximum	85	Maximum of Log Data	4.443
Mean	59.59	Mean of log Data	4.018
Median	63.2	SD of log Data	0.411
SD	21.04		
Coefficient of Variation	0.353		
Skewness	-0.338		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.887
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	70.5	95% H-UCL	77.88
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	91.62
95% Adjusted-CLT UCL (Chen-1995)	68.95	97.5% Chebyshev (MVUE) UCL	105.3
95% Modified-t UCL (Johnson-1978)	70.4	99% Chebyshev (MVUE) UCL	132.1
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.563	Data appear Normal at 5% Significance Level	
Theta Star	10.71		
MLE of Mean	59.59		
MLE of Standard Deviation	25.27		
nu star	133.5		
Approximate Chi Square Value (.05)	107.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	69.58
Adjusted Chi Square Value	104.3	95% Jackknife UCL	70.5
Anderson-Darling Test Statistic	0.502	95% Standard Bootstrap UCL	68.91
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	69.38
Kolmogorov-Smirnov Test Statistic	0.19	95% Hall's Bootstrap UCL	68.63
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	68.84
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	68.84
		95% Chebyshev(Mean, Sd) UCL	86.07
		97.5% Chebyshev(Mean, Sd) UCL	97.53
		99% Chebyshev(Mean, Sd) UCL	120
Assuming Gamma Distribution			
95% Approximate Gamma UCL	73.79		
95% Adjusted Gamma UCL	76.28		
Potential UCL to Use		Use 95% Student's-t UCL	70.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	11.5	Minimum of Log Data	2.442
Maximum	19.3	Maximum of Log Data	2.96
Mean	15.4	Mean of log Data	2.729
Median	15.4	SD of log Data	0.111
SD	1.663		
Coefficient of Variation	0.108		
Skewness	-7.75E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.591
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16.26	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16.36
95% Adjusted-CLT UCL (Chen-1995)	16.19	95% Chebyshev (MVUE) UCL	17.56
95% Modified-t UCL (Johnson-1978)	16.26	97.5% Chebyshev (MVUE) UCL	18.49
		99% Chebyshev (MVUE) UCL	20.33

Gamma Distribution Test

k star (bias corrected)	68.07	Data Distribution	
Theta Star	0.226	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	15.4		
MLE of Standard Deviation	1.867		
nu star	1634		
Approximate Chi Square Value (.05)	1541	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	16.19
Adjusted Chi Square Value	1527	95% Jackknife UCL	16.26

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.724	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.431	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	17.49
		97.5% Chebyshev(Mean, Sd) UCL	18.4
		99% Chebyshev(Mean, Sd) UCL	20.18
Assuming Gamma Distribution			
95% Approximate Gamma UCL	16.33		
95% Adjusted Gamma UCL	16.48		

Potential UCL to Use

Use 95% Student's-t UCL	16.26
or 95% Modified-t UCL	16.26

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	23.3	Minimum of Log Data	3.148
Maximum	195.6	Maximum of Log Data	5.276
Mean	100	Mean of log Data	4.406
Median	92.48	SD of log Data	0.722
SD	57.09		
Coefficient of Variation	0.571		
Skewness	0.246		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	129.6	95% H-UCL	181.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	201.9
95% Adjusted-CLT UCL (Chen-1995)	128.4	97.5% Chebyshev (MVUE) UCL	244.4
95% Modified-t UCL (Johnson-1978)	129.8	99% Chebyshev (MVUE) UCL	327.9
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.053	Data appear Normal at 5% Significance Level	
Theta Star	48.73		
MLE of Mean	100	Nonparametric Statistics	
MLE of Standard Deviation	69.82	95% CLT UCL	127.1
nu star	49.27	95% Jackknife UCL	129.6
Approximate Chi Square Value (.05)	34.15	95% Standard Bootstrap UCL	126.2
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	132.8
Adjusted Chi Square Value	32.24	95% Hall's Bootstrap UCL	129.6
Anderson-Darling Test Statistic	0.474	95% Percentile Bootstrap UCL	125.8
Anderson-Darling 5% Critical Value	0.74	95% BCA Bootstrap UCL	127.5
Kolmogorov-Smirnov Test Statistic	0.206	95% Chebyshev(Mean, Sd) UCL	171.9
Kolmogorov-Smirnov 5% Critical Value	0.248	97.5% Chebyshev(Mean, Sd) UCL	203
Data appear Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	264
Assuming Gamma Distribution			
95% Approximate Gamma UCL	144.3		
95% Adjusted Gamma UCL	152.9		
Potential UCL to Use		Use 95% Student's-t UCL	129.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	18071	Log-transformed Statistics	
Maximum	92700	Minimum of Log Data	9.802
Mean	35611	Maximum of Log Data	11.44
Median	27135	Mean of log Data	10.37
SD	20449	SD of log Data	0.444
Coefficient of Variation	0.574		
Skewness	2.308		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.722	Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	46212	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	46651
95% Adjusted-CLT UCL (Chen-1995)	49524	95% Chebyshev (MVUE) UCL	54971
95% Modified-t UCL (Johnson-1978)	46868	97.5% Chebyshev (MVUE) UCL	63595
		99% Chebyshev (MVUE) UCL	80535

Gamma Distribution Test

k star (bias corrected)	3.723	Data Distribution	
Theta Star	9564	3.723 ata Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	35611		
MLE of Standard Deviation	18455		
nu star	89.36		
Approximate Chi Square Value (.05)	68.56	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	45320
Adjusted Chi Square Value	65.79	95% Jackknife UCL	46212
		95% Standard Bootstrap UCL	44826

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.815	95% Bootstrap-t UCL	62648
Kolmogorov-Smirnov Test Statistic	0.732	95% Hall's Bootstrap UCL	90761
Kolmogorov-Smirnov 5% Critical Value	0.237	95% Percentile Bootstrap UCL	45929
Data follow Appr. Gamma Distribution at 5% Significance Level	0.246	95% BCA Bootstrap UCL	49203
		95% Chebyshev(Mean, Sd) UCL	61342
		97.5% Chebyshev(Mean, Sd) UCL	72475
		99% Chebyshev(Mean, Sd) UCL	94345

Assuming Gamma Distribution

95% Approximate Gamma UCL	46412
95% Adjusted Gamma UCL	48369

Potential UCL to Use

Use 95% Approximate Gamma UCL 46412

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	382.8	Log-transformed Statistics	
Maximum	1854	Minimum of Log Data	5.947
Mean	992.1	Maximum of Log Data	7.525
Median	773.3	Mean of log Data	6.795
SD	470	SD of log Data	0.483
Coefficient of Variation	0.474		
Skewness	0.606		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.905	Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1236	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1368
95% Adjusted-CLT UCL (Chen-1995)	1241	95% Chebyshev (MVUE) UCL	1611
95% Modified-t UCL (Johnson-1978)	1240	97.5% Chebyshev (MVUE) UCL	1878
		99% Chebyshev (MVUE) UCL	2403

Gamma Distribution Test

k star (bias corrected)	3.755	Data Distribution	
Theta Star	264.2	Data appear Normal at 5% Significance Level	
MLE of Mean	992.1		
MLE of Standard Deviation	512		
nu star	90.13		
Approximate Chi Square Value (.05)	69.24	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1215
Adjusted Chi Square Value	66.45	95% Jackknife UCL	1236
		95% Standard Bootstrap UCL	1204

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.441	95% Bootstrap-t UCL	1273
Kolmogorov-Smirnov Test Statistic	0.732	95% Hall's Bootstrap UCL	1218
Kolmogorov-Smirnov 5% Critical Value	0.209	95% Percentile Bootstrap UCL	1204
Data appear Gamma Distributed at 5% Significance Level	0.246	95% BCA Bootstrap UCL	1223
		95% Chebyshev(Mean, Sd) UCL	1583
		97.5% Chebyshev(Mean, Sd) UCL	1839
		99% Chebyshev(Mean, Sd) UCL	2342

Assuming Gamma Distribution

95% Approximate Gamma UCL	1291
95% Adjusted Gamma UCL	1346

Potential UCL to Use

Use 95% Student's-t UCL	1236
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0548	Minimum of Log Data	-2.904
Maximum	10	Maximum of Log Data	2.303
Mean	8.961	Mean of log Data	1.845
Median	10	SD of log Data	1.498
SD	2.897		
Coefficient of Variation	0.323		
Skewness	-3.135		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.428	Shapiro Wilk Test Statistic	0.352
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.46	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	112.5
95% Adjusted-CLT UCL (Chen-1995)	9.528	95% Chebyshev (MVUE) UCL	50.56
95% Modified-t UCL (Johnson-1978)	10.34	97.5% Chebyshev (MVUE) UCL	65.3
		99% Chebyshev (MVUE) UCL	94.25

Gamma Distribution Test

k star (bias corrected)	1.241	Data Distribution	
Theta Star	7.218	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.961		
MLE of Standard Deviation	8.043		
nu star	29.79		
Approximate Chi Square Value (.05)	18.33	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.34
Adjusted Chi Square Value	16.97	95% Jackknife UCL	10.46

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.912	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.745	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.491	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	12.61
		97.5% Chebyshev(Mean, Sd) UCL	14.18
		99% Chebyshev(Mean, Sd) UCL	17.28

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.56		
95% Adjusted Gamma UCL	15.73		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	12.61
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	2.8	Minimum of Log Data	1.03
Maximum	28.67	Maximum of Log Data	3.356
Mean	14.15	Mean of log Data	2.496
Median	15	SD of log Data	0.674
SD	6.494		
Coefficient of Variation	0.459		
Skewness	0.132		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.703	Shapiro Wilk Test Statistic	0.633
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	17.51	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	24.66
95% Adjusted-CLT UCL (Chen-1995)	17.31	95% Chebyshev (MVUE) UCL	28.01
95% Modified-t UCL (Johnson-1978)	17.53	97.5% Chebyshev (MVUE) UCL	33.68
		99% Chebyshev (MVUE) UCL	44.83

Gamma Distribution Test

k star (bias corrected)	2.616	Data Distribution	
Theta Star	5.408	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	14.15		
MLE of Standard Deviation	8.747		
nu star	62.78		
Approximate Chi Square Value (.05)	45.56	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	17.23
Adjusted Chi Square Value	43.32	95% Jackknife UCL	17.51
		95% Standard Bootstrap UCL	17.14
Anderson-Darling Test Statistic	2.308	95% Bootstrap-t UCL	17.59
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	18.33
Kolmogorov-Smirnov Test Statistic	0.447	95% Percentile Bootstrap UCL	17.28
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	17.44
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.32
		97.5% Chebyshev(Mean, Sd) UCL	25.85
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32.8
95% Approximate Gamma UCL	19.5		
95% Adjusted Gamma UCL	20.5		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 22.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.013	Minimum of Log Data	-4.343
Maximum	0.205	Maximum of Log Data	-1.585
Mean	0.109	Mean of log Data	-2.341
Median	0.109	SD of log Data	0.656
SD	0.0409		
Coefficient of Variation	0.376		
Skewness	5.17E-16		

Warning: There are only 3 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.482
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.13	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.19
95% Adjusted-CLT UCL (Chen-1995)	0.128	95% Chebyshev (MVUE) UCL	0.217
95% Modified-t UCL (Johnson-1978)	0.13	97.5% Chebyshev (MVUE) UCL	0.26
		99% Chebyshev (MVUE) UCL	0.345

Gamma Distribution Test

k star (bias corrected)	3.186	Data Distribution	
Theta Star	0.0342	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.109		
MLE of Standard Deviation	0.0611	Nonparametric Statistics	
nu star	76.46	95% CLT UCL	0.128
Approximate Chi Square Value (.05)	57.32	95% Jackknife UCL	0.13
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	N/A
Adjusted Chi Square Value	54.79	95% Bootstrap-t UCL	N/A

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.482	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.161
		97.5% Chebyshev(Mean, Sd) UCL	0.183
		99% Chebyshev(Mean, Sd) UCL	0.227

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.145		
95% Adjusted Gamma UCL	0.152		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.161

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	64.57	Minimum of Log Data	4.168
Maximum	1198	Maximum of Log Data	7.089
Mean	395	Mean of log Data	5.581
Median	248.4	SD of log Data	0.972
SD	354.3		
Coefficient of Variation	0.897		
Skewness	1.23		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	578.7	95% H-UCL	985.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	930.9
95% Adjusted-CLT UCL (Chen-1995)	602	97.5% Chebyshev (MVUE) UCL	1159
95% Modified-t UCL (Johnson-1978)	584.7	99% Chebyshev (MVUE) UCL	1607
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.107	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	356.9		
MLE of Mean	395	Nonparametric Statistics	
MLE of Standard Deviation	375.5	95% CLT UCL	563.2
nu star	26.56	95% Jackknife UCL	578.7
Approximate Chi Square Value (.05)	15.81	95% Standard Bootstrap UCL	552.8
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	656
Adjusted Chi Square Value	14.56	95% Hall's Bootstrap UCL	602.7
Anderson-Darling Test Statistic	0.308	95% Percentile Bootstrap UCL	567
Anderson-Darling 5% Critical Value	0.748	95% BCA Bootstrap UCL	621.1
Kolmogorov-Smirnov Test Statistic	0.134	95% Chebyshev(Mean, Sd) UCL	840.9
Kolmogorov-Smirnov 5% Critical Value	0.25	97.5% Chebyshev(Mean, Sd) UCL	1034
Data appear Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	1413
Assuming Gamma Distribution			
95% Approximate Gamma UCL	663.5		
95% Adjusted Gamma UCL	720.6		
Potential UCL to Use		Use 95% Approximate Gamma UCL	663.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.065	Minimum of Log Data	-2.733
Maximum	10	Maximum of Log Data	2.303
Mean	5.035	Mean of log Data	1.141
Median	5	SD of log Data	1.485
SD	2.954		
Coefficient of Variation	0.587		
Skewness	0.0818		

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 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.779	Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.566	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	53.26
95% Adjusted-CLT UCL (Chen-1995)	6.459	95% Chebyshev (MVUE) UCL	24.52
95% Modified-t UCL (Johnson-1978)	6.569	97.5% Chebyshev (MVUE) UCL	31.64
		99% Chebyshev (MVUE) UCL	45.64

Gamma Distribution Test

k star (bias corrected)	0.95	Data Distribution	
Theta Star	5.302	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.035		
MLE of Standard Deviation	5.167		
nu star	22.79		
Approximate Chi Square Value (.05)	12.93	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	6.437
Adjusted Chi Square Value	11.81	95% Jackknife UCL	6.566

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.032	95% Standard Bootstrap UCL	6.372
Anderson-Darling 5% Critical Value	0.752	95% Bootstrap-t UCL	6.713
Kolmogorov-Smirnov Test Statistic	0.452	95% Hall's Bootstrap UCL	6.922
Kolmogorov-Smirnov 5% Critical Value	0.251	95% Percentile Bootstrap UCL	6.285
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	6.279
		95% Chebyshev(Mean, Sd) UCL	8.751
		97.5% Chebyshev(Mean, Sd) UCL	10.36
		99% Chebyshev(Mean, Sd) UCL	13.52
Assuming Gamma Distribution			
95% Approximate Gamma UCL	8.872		
95% Adjusted Gamma UCL	9.714		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 8.751

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.028	Minimum of Log Data	-3.576
Maximum	13.41	Maximum of Log Data	2.596
Mean	8.623	Mean of log Data	1.377
Median	10	SD of log Data	2.233
SD	4.129		
Coefficient of Variation	0.479		
Skewness	-1.758		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.604	Shapiro Wilk Test Statistic	0.496
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.76	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1909
95% Adjusted-CLT UCL (Chen-1995)	9.937	95% Chebyshev (MVUE) UCL	116
95% Modified-t UCL (Johnson-1978)	10.66	97.5% Chebyshev (MVUE) UCL	153.7
		99% Chebyshev (MVUE) UCL	227.6

Gamma Distribution Test

k star (bias corrected)	0.631	Data Distribution	
Theta Star	13.66	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.623		
MLE of Standard Deviation	10.85		
nu star	15.15		
Approximate Chi Square Value (.05)	7.367	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.58
Adjusted Chi Square Value	6.555	95% Jackknife UCL	10.76
		95% Standard Bootstrap UCL	10.46
Anderson-Darling Test Statistic	3.44	95% Bootstrap-t UCL	10.26
Anderson-Darling 5% Critical Value	0.765	95% Hall's Bootstrap UCL	10.07
Kolmogorov-Smirnov Test Statistic	0.53	95% Percentile Bootstrap UCL	10.28
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	10.02
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.82
		97.5% Chebyshev(Mean, Sd) UCL	16.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.48
95% Approximate Gamma UCL	17.74		
95% Adjusted Gamma UCL	19.93		

Potential UCL to Use

Recommended UCL exceeds the maximum observation Use 99% Chebyshev (Mean, Sd) UCL 20.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	5.5	Log-transformed Statistics	
Maximum	349.2	Minimum of Log Data	1.705
Mean	83.16	Maximum of Log Data	5.856
Median	33.96	Mean of log Data	3.752
SD	107.6	SD of log Data	1.191
Coefficient of Variation	1.294		
Skewness	1.781		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.691	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	139	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	280.3
95% Adjusted-CLT UCL (Chen-1995)	151.3	95% Chebyshev (MVUE) UCL	207.9
95% Modified-t UCL (Johnson-1978)	141.6	97.5% Chebyshev (MVUE) UCL	263.6
		99% Chebyshev (MVUE) UCL	372.9

Gamma Distribution Test

k star (bias corrected)	0.713	Data Distribution	
Theta Star	116.6	Data appear Lognormal at 5% Significance Level	
MLE of Mean	83.16		
MLE of Standard Deviation	98.46		
nu star	17.12		
Approximate Chi Square Value (.05)	8.758	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	134.3
Adjusted Chi Square Value	7.861	95% Jackknife UCL	139
		95% Standard Bootstrap UCL	131.7
		95% Bootstrap-t UCL	176.1
		95% Hall's Bootstrap UCL	129.4
		95% Percentile Bootstrap UCL	136.2
		95% BCA Bootstrap UCL	151.5
		95% Chebyshev(Mean, Sd) UCL	218.6
		97.5% Chebyshev(Mean, Sd) UCL	277.2
		99% Chebyshev(Mean, Sd) UCL	392.3

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.761		
Kolmogorov-Smirnov Test Statistic	0.324		
Kolmogorov-Smirnov 5% Critical Value	0.254		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	162.6		
95% Adjusted Gamma UCL	181.1		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	218.6
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1	Minimum of Log Data	0
Maximum	6.61	Maximum of Log Data	1.889
Mean	3.805	Mean of log Data	1.271
Median	3.805	SD of log Data	0.431
SD	1.196		
Coefficient of Variation	0.314		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.524
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.425	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	5.109
95% Adjusted-CLT UCL (Chen-1995)	4.373	95% Chebyshev (MVUE) UCL	6.018
95% Modified-t UCL (Johnson-1978)	4.425	97.5% Chebyshev (MVUE) UCL	6.943
		99% Chebyshev (MVUE) UCL	8.762

Gamma Distribution Test

k star (bias corrected)	5.917	Data Distribution	
Theta Star	0.643	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.805		
MLE of Standard Deviation	1.564		
nu star	142		
Approximate Chi Square Value (.05)	115.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	4.373
Adjusted Chi Square Value	111.8	95% Jackknife UCL	4.425

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.837	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.464	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	5.31
		97.5% Chebyshev(Mean, Sd) UCL	5.961
		99% Chebyshev(Mean, Sd) UCL	7.24

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.679		
95% Adjusted Gamma UCL	4.832		

Potential UCL to Use

Use 95% Student's-t UCL	4.425
or 95% Modified-t UCL	4.425

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.052	Minimum of Log Data	-2.957
Maximum	0.37	Maximum of Log Data	-0.994
Mean	0.211	Mean of log Data	-1.626
Median	0.211	SD of log Data	0.449
SD	0.0678		
Coefficient of Variation	0.321		
Skewness	0		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.52
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.246	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.288
95% Adjusted-CLT UCL (Chen-1995)	0.243	95% Chebyshev (MVUE) UCL	0.34
95% Modified-t UCL (Johnson-1978)	0.246	97.5% Chebyshev (MVUE) UCL	0.394
		99% Chebyshev (MVUE) UCL	0.499

Gamma Distribution Test

k star (bias corrected)	5.541	Data Distribution	
Theta Star	0.0381	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.211		
MLE of Standard Deviation	0.0896		
nu star	133		
Approximate Chi Square Value (.05)	107.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.243
Adjusted Chi Square Value	103.8	95% Jackknife UCL	0.246

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.466	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.296
		97.5% Chebyshev(Mean, Sd) UCL	0.333
		99% Chebyshev(Mean, Sd) UCL	0.406

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.261		
95% Adjusted Gamma UCL	0.27		

Potential UCL to Use

Use 95% Student's-t UCL	0.246
or 95% Modified-t UCL	0.246

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1.5	Minimum of Log Data	0.405
Maximum	13.6	Maximum of Log Data	2.61
Mean	7.55	Mean of log Data	1.936
Median	7.55	SD of log Data	0.511
SD	2.58		
Coefficient of Variation	0.342		
Skewness	2.35E-15		

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 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.508
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.887	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11
95% Adjusted-CLT UCL (Chen-1995)	8.775	95% Chebyshev (MVUE) UCL	12.94
95% Modified-t UCL (Johnson-1978)	8.887	97.5% Chebyshev (MVUE) UCL	15.16
		99% Chebyshev (MVUE) UCL	19.53

Gamma Distribution Test

k star (bias corrected)	4.556	Data Distribution	
Theta Star	1.657	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.55		
MLE of Standard Deviation	3.537		
nu star	109.3		
Approximate Chi Square Value (.05)	86.21	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	8.775
Adjusted Chi Square Value	83.08	95% Jackknife UCL	8.887
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.876	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.8
		97.5% Chebyshev(Mean, Sd) UCL	12.2
		99% Chebyshev(Mean, Sd) UCL	14.96

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.576
95% Adjusted Gamma UCL	9.937

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 10.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	23.9	Minimum of Log Data	3.174
Maximum	86.2	Maximum of Log Data	4.457
Mean	55.05	Mean of log Data	3.976
Median	55.05	SD of log Data	0.284
SD	13.28		
Coefficient of Variation	0.241		
Skewness	2.88E-15		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.557
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	61.94	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	65.35
95% Adjusted-CLT UCL (Chen-1995)	61.36	95% Chebyshev (MVUE) UCL	75.2
95% Modified-t UCL (Johnson-1978)	61.94	97.5% Chebyshev (MVUE) UCL	83.81
		99% Chebyshev (MVUE) UCL	100.7

Gamma Distribution Test

k star (bias corrected)	11.84	Data Distribution	
Theta Star	4.65	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	55.05		
MLE of Standard Deviation	16		
nu star	284.1		
Approximate Chi Square Value (.05)	246.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	61.36
Adjusted Chi Square Value	240.7	95% Jackknife UCL	61.94
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.774	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.45	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	71.76
		97.5% Chebyshev(Mean, Sd) UCL	79
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	93.2
95% Approximate Gamma UCL	63.56		
95% Adjusted Gamma UCL	64.99		

Potential UCL to Use

Use 95% Student's-t UCL	61.94
or 95% Modified-t UCL	61.94

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
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 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 14-04.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 3

Raw Statistics

Minimum	11300	Log-transformed Statistics	
Maximum	12100	Minimum of Log Data	9.333
Mean	11700	Maximum of Log Data	9.401
Median	11700	Mean of log Data	9.367
SD	163.3	SD of log Data	0.014
Coefficient of Variation	0.014		
Skewness	0		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.574
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11781	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	11774	95% Chebyshev (MVUE) UCL	11898
95% Modified-t UCL (Johnson-1978)	11781	97.5% Chebyshev (MVUE) UCL	11983
		99% Chebyshev (MVUE) UCL	12151

Gamma Distribution Test

k star (bias corrected)	4275	Data Distribution	
Theta Star	2.737	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11700		
MLE of Standard Deviation	178.9		
nu star	111163	Nonparametric Statistics	
Approximate Chi Square Value (.05)	110388	95% CLT UCL	11774
Adjusted Level of Significance	0.0301	95% Jackknife UCL	11781
Adjusted Chi Square Value	110278	95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A

Anderson-Darling Test Statistic 3.415
 Anderson-Darling 5% Critical Value 0.732
 Kolmogorov-Smirnov Test Statistic 0.51
 Kolmogorov-Smirnov 5% Critical Value 0.236
 Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	11782	95% Percentile Bootstrap UCL	N/A
95% Adjusted Gamma UCL	11794	95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	11897
		97.5% Chebyshev(Mean, Sd) UCL	11983
		99% Chebyshev(Mean, Sd) UCL	12151

Potential UCL to Use

Use 95% Student's-t UCL 11781
 or 95% Modified-t UCL 11781

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.3	Minimum of Log Data	-1.204
Maximum	4.3	Maximum of Log Data	1.459
Mean	2.3	Mean of log Data	0.724
Median	2.3	SD of log Data	0.605
SD	0.816		
Coefficient of Variation	0.355		
Skewness	-1.9E-15		

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.464
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.704	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	3.663
95% Adjusted-CLT UCL (Chen-1995)	2.672	95% Chebyshev (MVUE) UCL	4.285
95% Modified-t UCL (Johnson-1978)	2.704	97.5% Chebyshev (MVUE) UCL	5.084
		99% Chebyshev (MVUE) UCL	6.654

Gamma Distribution Test

k star (bias corrected)	3.718	Data Distribution	
Theta Star	0.619	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.3		
MLE of Standard Deviation	1.193		
nu star	96.66		
Approximate Chi Square Value (.05)	74.98	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	2.672
Adjusted Chi Square Value	72.27	95% Jackknife UCL	2.704
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.295	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.484	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.287
		97.5% Chebyshev(Mean, Sd) UCL	3.714
		99% Chebyshev(Mean, Sd) UCL	4.553

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.965		
95% Adjusted Gamma UCL	3.076		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 3.287

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11
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Raw Statistics

Minimum	5.9	Log-transformed Statistics	
Maximum	20.75	Minimum of Log Data	1.775
Mean	10.45	Maximum of Log Data	3.033
Median	9.8	Mean of log Data	2.295
SD	3.84	SD of log Data	0.324
Coefficient of Variation	0.367		
Skewness	1.74		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.948
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.35	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.53
95% Adjusted-CLT UCL (Chen-1995)	12.76	95% Chebyshev (MVUE) UCL	14.54
95% Modified-t UCL (Johnson-1978)	12.44	97.5% Chebyshev (MVUE) UCL	16.33
		99% Chebyshev (MVUE) UCL	19.83

Gamma Distribution Test

k star (bias corrected)	7.581	Data Distribution	
Theta Star	1.379	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	10.45		
MLE of Standard Deviation	3.797		
nu star	197.1		
Approximate Chi Square Value (.05)	165.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	12.21
Adjusted Chi Square Value	161.5	95% Jackknife UCL	12.35
		95% Standard Bootstrap UCL	12.11
		95% Bootstrap-t UCL	13.51
		95% Hall's Bootstrap UCL	22.14
		95% Percentile Bootstrap UCL	12.22
		95% BCA Bootstrap UCL	12.87
		95% Chebyshev(Mean, Sd) UCL	15.1
		97.5% Chebyshev(Mean, Sd) UCL	17.11
		99% Chebyshev(Mean, Sd) UCL	21.05

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.46		
Anderson-Darling 5% Critical Value	0.734		
Kolmogorov-Smirnov Test Statistic	0.205		
Kolmogorov-Smirnov 5% Critical Value	0.237		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.44		
95% Adjusted Gamma UCL	12.76		

Potential UCL to Use

Use 95% Approximate Gamma UCL	12.44
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
Raw Statistics		Log-transformed Statistics	
Minimum	18.7	Minimum of Log Data	2.929
Maximum	85	Maximum of Log Data	4.443
Mean	47.5	Mean of log Data	3.792
Median	41.59	SD of log Data	0.394
SD	18.31		
Coefficient of Variation	0.386		
Skewness	0.792		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Test Statistic	0.929	Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	0.866		
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	56.55	95% H-UCL	60.12
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	70.66
95% Adjusted-CLT UCL (Chen-1995)	57.05	97.5% Chebyshev (MVUE) UCL	80.63
95% Modified-t UCL (Johnson-1978)	56.74	99% Chebyshev (MVUE) UCL	100.2
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.738	Data appear Normal at 5% Significance Level	
Theta Star	8.277		
MLE of Mean	47.5		
MLE of Standard Deviation	19.83		
nu star	149.2		
Approximate Chi Square Value (.05)	122	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	55.85
Adjusted Chi Square Value	118.5	95% Jackknife UCL	56.55
Anderson-Darling Test Statistic	0.306	95% Standard Bootstrap UCL	55.54
Anderson-Darling 5% Critical Value	0.735	95% Bootstrap-t UCL	59.17
Kolmogorov-Smirnov Test Statistic	0.157	95% Hall's Bootstrap UCL	60.82
Kolmogorov-Smirnov 5% Critical Value	0.237	95% Percentile Bootstrap UCL	55.91
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	57.43
		95% Chebyshev(Mean, Sd) UCL	69.64
		97.5% Chebyshev(Mean, Sd) UCL	79.22
		99% Chebyshev(Mean, Sd) UCL	98.04
Assuming Gamma Distribution			
95% Approximate Gamma UCL	58.1		
95% Adjusted Gamma UCL	59.82		
Potential UCL to Use		Use 95% Student's-t UCL	56.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	13.9	Minimum of Log Data	2.632
Maximum	15.1	Maximum of Log Data	2.715
Mean	14.5	Mean of log Data	2.674
Median	14.5	SD of log Data	0.0169
SD	0.245		
Coefficient of Variation	0.0169		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.574
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	14.62
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	14.61
95% Modified-t UCL (Johnson-1978)	14.62

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	14.8
97.5% Chebyshev (MVUE) UCL	14.92
99% Chebyshev (MVUE) UCL	15.18

Gamma Distribution Test

k star (bias corrected)	2918
Theta Star	0.00497
MLE of Mean	14.5
MLE of Standard Deviation	0.268
nu star	75863
Approximate Chi Square Value (.05)	75224
Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	75133

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	14.61
95% Jackknife UCL	14.62
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	14.8
97.5% Chebyshev(Mean, Sd) UCL	14.92
99% Chebyshev(Mean, Sd) UCL	15.18

Anderson-Darling Test Statistic	3.183
Anderson-Darling 5% Critical Value	0.732
Kolmogorov-Smirnov Test Statistic	0.473
Kolmogorov-Smirnov 5% Critical Value	0.236
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.62
95% Adjusted Gamma UCL	14.64

Potential UCL to Use

Use 95% Student's-t UCL	14.62
or 95% Modified-t UCL	14.62

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
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Raw Statistics

Minimum	29.72	Log-transformed Statistics	
Maximum	1099	Minimum of Log Data	3.392
Mean	211.2	Maximum of Log Data	7.002
Median	149.1	Mean of log Data	4.888
SD	279.5	SD of log Data	0.934
Coefficient of Variation	1.323		
Skewness	3.07		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.587	Shapiro Wilk Test Statistic	0.966
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	349.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	428.5
95% Adjusted-CLT UCL (Chen-1995)	409.2	95% Chebyshev (MVUE) UCL	433.3
95% Modified-t UCL (Johnson-1978)	360.4	97.5% Chebyshev (MVUE) UCL	536
		99% Chebyshev (MVUE) UCL	737.6

Gamma Distribution Test

k star (bias corrected)	0.985	Data Distribution	
Theta Star	214.4	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	211.2		
MLE of Standard Deviation	212.8		
nu star	25.61		
Approximate Chi Square Value (.05)	15.08	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	338.7
Adjusted Chi Square Value	13.94	95% Jackknife UCL	349.4
		95% Standard Bootstrap UCL	330.7

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.611	95% Bootstrap-t UCL	618.7
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	848
Kolmogorov-Smirnov Test Statistic	0.19	95% Percentile Bootstrap UCL	350.1
Kolmogorov-Smirnov 5% Critical Value	0.242	95% BCA Bootstrap UCL	437.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	549.1
		97.5% Chebyshev(Mean, Sd) UCL	695.3
		99% Chebyshev(Mean, Sd) UCL	982.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	358.7		
95% Adjusted Gamma UCL	388.1		

Potential UCL to Use

Use 95% Approximate Gamma UCL	358.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
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Raw Statistics

Minimum	14880	Log-transformed Statistics	
Maximum	62968	Minimum of Log Data	9.608
Mean	32098	Maximum of Log Data	11.05
Median	32463	Mean of log Data	10.29
SD	13660	SD of log Data	0.426
Coefficient of Variation	0.426		
Skewness	0.922		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.926	Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	38850	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	41559
95% Adjusted-CLT UCL (Chen-1995)	39364	95% Chebyshev (MVUE) UCL	49011
95% Modified-t UCL (Johnson-1978)	39012	97.5% Chebyshev (MVUE) UCL	56315
		99% Chebyshev (MVUE) UCL	70662

Gamma Distribution Test

k star (bias corrected)	4.847	Data Distribution	
Theta Star	6622	Data appear Normal at 5% Significance Level	
MLE of Mean	32098		
MLE of Standard Deviation	14579		
nu star	126		
Approximate Chi Square Value (.05)	101.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	38330
Adjusted Chi Square Value	97.93	95% Jackknife UCL	38850
		95% Standard Bootstrap UCL	38010
		95% Bootstrap-t UCL	40899
		95% Hall's Bootstrap UCL	43205
		95% Percentile Bootstrap UCL	38220
		95% BCA Bootstrap UCL	39153
		95% Chebyshev(Mean, Sd) UCL	48612
		97.5% Chebyshev(Mean, Sd) UCL	55758
		99% Chebyshev(Mean, Sd) UCL	69794

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.246		
Anderson-Darling 5% Critical Value	0.735		
Kolmogorov-Smirnov Test Statistic	0.145		
Kolmogorov-Smirnov 5% Critical Value	0.237		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	40012		
95% Adjusted Gamma UCL	41311		

Potential UCL to Use

Use 95% Student's-t UCL	38850
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
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Raw Statistics

Minimum	381.6	Log-transformed Statistics	
Maximum	1232	Minimum of Log Data	5.944
Mean	848.9	Maximum of Log Data	7.116
Median	869	Mean of log Data	6.679
SD	296.7	SD of log Data	0.39
Coefficient of Variation	0.35		
Skewness	-0.156		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	995.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1074
95% Adjusted-CLT UCL (Chen-1995)	980.4	95% Chebyshev (MVUE) UCL	1262
95% Modified-t UCL (Johnson-1978)	995	97.5% Chebyshev (MVUE) UCL	1439
		99% Chebyshev (MVUE) UCL	1786

Gamma Distribution Test

k star (bias corrected)	6.093	Data Distribution	
Theta Star	139.3	Data appear Normal at 5% Significance Level	
MLE of Mean	848.9		
MLE of Standard Deviation	343.9		
nu star	158.4		
Approximate Chi Square Value (.05)	130.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	984.2
Adjusted Chi Square Value	126.7	95% Jackknife UCL	995.6
		95% Standard Bootstrap UCL	980.4
		95% Bootstrap-t UCL	985.9
		95% Hall's Bootstrap UCL	973.1
		95% Percentile Bootstrap UCL	978.1
		95% BCA Bootstrap UCL	971.1
		95% Chebyshev(Mean, Sd) UCL	1208
		97.5% Chebyshev(Mean, Sd) UCL	1363
		99% Chebyshev(Mean, Sd) UCL	1668

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.429		
Anderson-Darling 5% Critical Value	0.735		
Kolmogorov-Smirnov Test Statistic	0.16		
Kolmogorov-Smirnov 5% Critical Value	0.237		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	1032		
95% Adjusted Gamma UCL	1061		

Potential UCL to Use

Use 95% Student's-t UCL	995.6
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.0152	Minimum of Log Data	-4.186
Maximum	10	Maximum of Log Data	2.303
Mean	8.346	Mean of log Data	1.554
Median	10	SD of log Data	1.915
SD	3.636		
Coefficient of Variation	0.436		
Skewness	-2.087		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.51	Shapiro Wilk Test Statistic	0.468
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.14
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9.381
95% Modified-t UCL (Johnson-1978)	10.05

Assuming Lognormal Distribution

95% H-UCL	374.8
95% Chebyshev (MVUE) UCL	78.05
97.5% Chebyshev (MVUE) UCL	102.4
99% Chebyshev (MVUE) UCL	150.1

Gamma Distribution Test

k star (bias corrected)	0.832
Theta Star	10.04
MLE of Mean	8.346
MLE of Standard Deviation	9.152
nu star	21.62
Approximate Chi Square Value (.05)	12.06
Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	11.05

Data do not follow a Discernable Distribution (0.05)

Data Distribution

Nonparametric Statistics

95% CLT UCL	10.01
95% Jackknife UCL	10.14
95% Standard Bootstrap UCL	9.86
95% Bootstrap-t UCL	9.687
95% Hall's Bootstrap UCL	9.492
95% Percentile Bootstrap UCL	9.692
95% BCA Bootstrap UCL	9.268
95% Chebyshev(Mean, Sd) UCL	12.74
97.5% Chebyshev(Mean, Sd) UCL	14.64
99% Chebyshev(Mean, Sd) UCL	18.38

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.63
Anderson-Darling 5% Critical Value	0.757
Kolmogorov-Smirnov Test Statistic	0.467
Kolmogorov-Smirnov 5% Critical Value	0.243

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.97
95% Adjusted Gamma UCL	16.33

Potential UCL to Use

Recommended UCL exceeds the maximum observation

Use 99% Chebyshev (Mean, Sd) UCL 18.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.112	Minimum of Log Data	-2.189
Maximum	2.68	Maximum of Log Data	0.986
Mean	1.396	Mean of log Data	0.19
Median	1.396	SD of log Data	0.737
SD	0.524		
Coefficient of Variation	0.375		
Skewness	-3E-15		

Warning: There are only 3 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.444
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.655	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2.658
95% Adjusted-CLT UCL (Chen-1995)	1.635	95% Chebyshev (MVUE) UCL	2.995
95% Modified-t UCL (Johnson-1978)	1.655	97.5% Chebyshev (MVUE) UCL	3.621
		99% Chebyshev (MVUE) UCL	4.852

Gamma Distribution Test

k star (bias corrected)	2.846	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.491		
MLE of Mean	1.396		
MLE of Standard Deviation	0.828		
nu star	73.99		
Approximate Chi Square Value (.05)	55.18	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	1.635
Adjusted Chi Square Value	52.87	95% Jackknife UCL	1.655

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.367	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.738	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.493	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.238	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.872	95% Chebyshev(Mean, Sd) UCL	2.03
95% Adjusted Gamma UCL	1.954	97.5% Chebyshev(Mean, Sd) UCL	2.304
		99% Chebyshev(Mean, Sd) UCL	2.843

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.03

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 13

Raw Statistics

Minimum	151.2	Log-transformed Statistics	
Maximum	1591	Minimum of Log Data	5.018
Mean	504.9	Maximum of Log Data	7.372
Median	383	Mean of log Data	5.998
SD	396.9	SD of log Data	0.675
Coefficient of Variation	0.786		
Skewness	1.918		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.795	Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	701.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	797.5
95% Adjusted-CLT UCL (Chen-1995)	748.6	95% Chebyshev (MVUE) UCL	917.6
95% Modified-t UCL (Johnson-1978)	710.9	97.5% Chebyshev (MVUE) UCL	1100
		99% Chebyshev (MVUE) UCL	1459

Gamma Distribution Test

k star (bias corrected)	1.868	Data Distribution	
Theta Star	270.3	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	504.9		
MLE of Standard Deviation	369.5		
nu star	48.56		
Approximate Chi Square Value (.05)	33.57	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	686
Adjusted Chi Square Value	31.8	95% Jackknife UCL	701.1
		95% Standard Bootstrap UCL	683.8
		95% Bootstrap-t UCL	843.3
		95% Hall's Bootstrap UCL	1291
		95% Percentile Bootstrap UCL	686
		95% BCA Bootstrap UCL	772.8
		95% Chebyshev(Mean, Sd) UCL	984.8
		97.5% Chebyshev(Mean, Sd) UCL	1192
		99% Chebyshev(Mean, Sd) UCL	1600

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.386		
Anderson-Darling 5% Critical Value	0.742		
Kolmogorov-Smirnov Test Statistic	0.162		
Kolmogorov-Smirnov 5% Critical Value	0.239		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	730.5		
95% Adjusted Gamma UCL	771.2		

Potential UCL to Use

Use 95% Approximate Gamma UCL 730.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.36	Minimum of Log Data	-1.022
Maximum	10	Maximum of Log Data	2.303
Mean	5.228	Mean of log Data	1.463
Median	5	SD of log Data	0.818
SD	2.527		
Coefficient of Variation	0.483		
Skewness	0.512		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.759	Shapiro Wilk Test Statistic	0.619
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.477
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	6.487
95% Modified-t UCL (Johnson-1978)	6.493

Assuming Lognormal Distribution

95% H-UCL	11.02
95% Chebyshev (MVUE) UCL	11.97
97.5% Chebyshev (MVUE) UCL	14.62
99% Chebyshev (MVUE) UCL	19.83

Gamma Distribution Test

k star (bias corrected)	2.189
Theta Star	2.388
MLE of Mean	5.228
MLE of Standard Deviation	3.533
nu star	56.91
Approximate Chi Square Value (.05)	40.57
Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	38.61

Data do not follow a Discernable Distribution (0.05)

Data Distribution

Nonparametric Statistics

95% CLT UCL	6.38
95% Jackknife UCL	6.477
95% Standard Bootstrap UCL	6.374
95% Bootstrap-t UCL	6.82
95% Hall's Bootstrap UCL	8.358
95% Percentile Bootstrap UCL	6.354
95% BCA Bootstrap UCL	6.382
95% Chebyshev(Mean, Sd) UCL	8.282
97.5% Chebyshev(Mean, Sd) UCL	9.604
99% Chebyshev(Mean, Sd) UCL	12.2

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.91
Anderson-Darling 5% Critical Value	0.74
Kolmogorov-Smirnov Test Statistic	0.397
Kolmogorov-Smirnov 5% Critical Value	0.238

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.333
95% Adjusted Gamma UCL	7.705

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 8.282

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	5
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Raw Statistics

Minimum	1.2	Log-transformed Statistics	
Maximum	11.7	Minimum of Log Data	0.182
Mean	9.582	Maximum of Log Data	2.46
Median	10	Mean of log Data	2.164
SD	2.573	SD of log Data	0.597
Coefficient of Variation	0.269		
Skewness	-3.324		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.469	Shapiro Wilk Test Statistic	0.374
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.29
95% Adjusted-CLT UCL (Chen-1995)	10.05	95% Chebyshev (MVUE) UCL	17.91
95% Modified-t UCL (Johnson-1978)	10.74	97.5% Chebyshev (MVUE) UCL	21.22
		99% Chebyshev (MVUE) UCL	27.73

Gamma Distribution Test

k star (bias corrected)	4.181	Data Distribution	
Theta Star	2.291	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.582		
MLE of Standard Deviation	4.686		
nu star	108.7		
Approximate Chi Square Value (.05)	85.65	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.76
Adjusted Chi Square Value	82.74	95% Jackknife UCL	10.85

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.736	95% Standard Bootstrap UCL	10.75
Kolmogorov-Smirnov Test Statistic	0.519	95% Bootstrap-t UCL	10.44
Kolmogorov-Smirnov 5% Critical Value	0.237	95% Hall's Bootstrap UCL	10.32
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	10.45
		95% BCA Bootstrap UCL	10.38
		95% Chebyshev(Mean, Sd) UCL	12.69
		97.5% Chebyshev(Mean, Sd) UCL	14.04
		99% Chebyshev(Mean, Sd) UCL	16.68

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.16
95% Adjusted Gamma UCL	12.59

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	12.69
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1.06	Minimum of Log Data	0.0583
Maximum	8.33	Maximum of Log Data	2.12
Mean	4.695	Mean of log Data	1.476
Median	4.695	SD of log Data	0.455
SD	1.484		
Coefficient of Variation	0.316		
Skewness	1.7E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.492
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.429
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	5.372
95% Modified-t UCL (Johnson-1978)	5.429

Assuming Lognormal Distribution

95% H-UCL	6.359
95% Chebyshev (MVUE) UCL	7.512
97.5% Chebyshev (MVUE) UCL	8.681
99% Chebyshev (MVUE) UCL	10.98

Gamma Distribution Test

k star (bias corrected)	5.642
Theta Star	0.832
MLE of Mean	4.695
MLE of Standard Deviation	1.977
nu star	146.7
Approximate Chi Square Value (.05)	119.7
Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	116.2

Data do not follow a Discernable Distribution (0.05)

Data Distribution

Nonparametric Statistics

95% CLT UCL	5.372
95% Jackknife UCL	5.429
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	6.489
97.5% Chebyshev(Mean, Sd) UCL	7.265
99% Chebyshev(Mean, Sd) UCL	8.79

Anderson-Darling Test Statistic	3.216
Anderson-Darling 5% Critical Value	0.735
Kolmogorov-Smirnov Test Statistic	0.472
Kolmogorov-Smirnov 5% Critical Value	0.237
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.754
95% Adjusted Gamma UCL	5.926

Potential UCL to Use

Use 95% Student's-t UCL	5.429
or 95% Modified-t UCL	5.429

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0051	Minimum of Log Data	-5.279
Maximum	0.251	Maximum of Log Data	-1.383
Mean	0.128	Mean of log Data	-2.252
Median	0.128	SD of log Data	0.928
SD	0.0501		
Coefficient of Variation	0.392		
Skewness	4.1E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.422
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.153	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.336
95% Adjusted-CLT UCL (Chen-1995)	0.151	95% Chebyshev (MVUE) UCL	0.341
95% Modified-t UCL (Johnson-1978)	0.153	97.5% Chebyshev (MVUE) UCL	0.421
		99% Chebyshev (MVUE) UCL	0.579

Gamma Distribution Test

k star (bias corrected)	2.132	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.06		
MLE of Mean	0.128		
MLE of Standard Deviation	0.0876		
nu star	55.43		
Approximate Chi Square Value (.05)	39.32	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	0.151
Adjusted Chi Square Value	37.39	95% Jackknife UCL	0.153
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.471	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.504	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.189
		97.5% Chebyshev(Mean, Sd) UCL	0.215
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.266
95% Approximate Gamma UCL	0.18		
95% Adjusted Gamma UCL	0.19		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.189

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations 13 Number of Distinct Observations 13

Raw Statistics

Minimum	93	Log-transformed Statistics	
Maximum	663.2	Minimum of Log Data	4.533
Mean	270.1	Maximum of Log Data	6.497
Median	187.2	Mean of log Data	5.428
SD	172.7	SD of log Data	0.597
Coefficient of Variation	0.64		
Skewness	1.22		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	355.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	399.7
95% Adjusted-CLT UCL (Chen-1995)	366.2	95% Chebyshev (MVUE) UCL	468.1
95% Modified-t UCL (Johnson-1978)	358.1	97.5% Chebyshev (MVUE) UCL	554.8
		99% Chebyshev (MVUE) UCL	724.9

Gamma Distribution Test

k star (bias corrected)	2.43	Data Distribution	
Theta Star	111.1	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	270.1		
MLE of Standard Deviation	173.2		
nu star	63.17		
Approximate Chi Square Value (.05)	45.89	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	348.9
Adjusted Chi Square Value	43.8	95% Jackknife UCL	355.4
		95% Standard Bootstrap UCL	344.2
		95% Bootstrap-t UCL	389.3
		95% Hall's Bootstrap UCL	374.3
		95% Percentile Bootstrap UCL	350.1
		95% BCA Bootstrap UCL	372.3
		95% Chebyshev(Mean, Sd) UCL	478.9
		97.5% Chebyshev(Mean, Sd) UCL	569.3
		99% Chebyshev(Mean, Sd) UCL	746.8

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.43		
Anderson-Darling 5% Critical Value	0.739		
Kolmogorov-Smirnov Test Statistic	0.198		
Kolmogorov-Smirnov 5% Critical Value	0.238		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	371.8		
95% Adjusted Gamma UCL	389.5		

Potential UCL to Use

Use 95% Approximate Gamma UCL 371.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	6.76	Minimum of Log Data	1.911
Maximum	113	Maximum of Log Data	4.727
Mean	59.88	Mean of log Data	3.973
Median	59.88	SD of log Data	0.644
SD	21.69		
Coefficient of Variation	0.362		
Skewness	5.6E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.458
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.6
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	69.77
95% Modified-t UCL (Johnson-1978)	70.6

Assuming Lognormal Distribution

95% H-UCL	100.2
95% Chebyshev (MVUE) UCL	116.2
97.5% Chebyshev (MVUE) UCL	138.8
99% Chebyshev (MVUE) UCL	183

Gamma Distribution Test

k star (bias corrected)	3.408
Theta Star	17.57
MLE of Mean	59.88
MLE of Standard Deviation	32.44
nu star	88.6
Approximate Chi Square Value (.05)	67.9
Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	65.32

Data do not follow a Discernable Distribution (0.05)

Data Distribution

Nonparametric Statistics

95% CLT UCL	69.77
95% Jackknife UCL	70.6
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	86.1
97.5% Chebyshev(Mean, Sd) UCL	97.44
99% Chebyshev(Mean, Sd) UCL	119.7

Anderson-Darling Test Statistic	3.316
Anderson-Darling 5% Critical Value	0.737
Kolmogorov-Smirnov Test Statistic	0.487
Kolmogorov-Smirnov 5% Critical Value	0.238
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	78.14
95% Adjusted Gamma UCL	81.22

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 86.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.507	Minimum of Log Data	-0.679
Maximum	8	Maximum of Log Data	2.079
Mean	4.254	Mean of log Data	1.333
Median	4.254	SD of log Data	0.629
SD	1.53		
Coefficient of Variation	0.36		
Skewness	-1.6E-15		

Warning: There are only 3 Distinct Values in this data
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 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.46
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.984
95% Adjusted-CLT UCL (Chen-1995)	4.951	95% Chebyshev (MVUE) UCL	8.13
95% Modified-t UCL (Johnson-1978)	5.01	97.5% Chebyshev (MVUE) UCL	9.683
		99% Chebyshev (MVUE) UCL	12.73

Gamma Distribution Test

k star (bias corrected)	3.518	Data Distribution	
Theta Star	1.209	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.254		
MLE of Standard Deviation	2.268		
nu star	91.47		
Approximate Chi Square Value (.05)	70.42	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	4.951
Adjusted Chi Square Value	67.79	95% Jackknife UCL	5.01
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.308	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.486	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.103
		97.5% Chebyshev(Mean, Sd) UCL	6.903
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	8.474
95% Approximate Gamma UCL	5.525		
95% Adjusted Gamma UCL	5.739		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 6.103

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	9.21	Minimum of Log Data	2.22
Maximum	169	Maximum of Log Data	5.13
Mean	89.11	Mean of log Data	4.364
Median	89.11	SD of log Data	0.668
SD	32.62		
Coefficient of Variation	0.366		
Skewness	-1.5E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic	0.454
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	105.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	153.9
95% Adjusted-CLT UCL (Chen-1995)	104	95% Chebyshev (MVUE) UCL	177.4
95% Modified-t UCL (Johnson-1978)	105.2	97.5% Chebyshev (MVUE) UCL	212.5
		99% Chebyshev (MVUE) UCL	281.5

Gamma Distribution Test

k star (bias corrected)	3.242	Data Distribution	
Theta Star	27.48	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	89.11		
MLE of Standard Deviation	49.48		
nu star	84.3		
Approximate Chi Square Value (.05)	64.14	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	104
Adjusted Chi Square Value	61.64	95% Jackknife UCL	105.2

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.329	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.488	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.238	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	117.1	95% Chebyshev(Mean, Sd) UCL	128.5
95% Adjusted Gamma UCL	121.9	97.5% Chebyshev(Mean, Sd) UCL	145.6
		99% Chebyshev(Mean, Sd) UCL	179.1

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 128.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 14-05.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Antimony

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.37	Minimum of Log Data	-0.994
Maximum	2.3	Maximum of Log Data	0.833
Mean	1.39	Mean of log Data	0.267
Median	1.39	SD of log Data	0.423
SD	0.413		
Coefficient of Variation	0.297		
Skewness	-0.473		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.535
Shapiro Wilk Test Statistic	0.636	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.604	95% H-UCL	1.855
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.184
95% Adjusted-CLT UCL (Chen-1995)	1.569	97.5% Chebyshev (MVUE) UCL	2.516
95% Modified-t UCL (Johnson-1978)	1.602	99% Chebyshev (MVUE) UCL	3.168

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.228	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.223		
MLE of Mean	1.39	Nonparametric Statistics	
MLE of Standard Deviation	0.557	95% CLT UCL	1.586
nu star	149.5	95% Jackknife UCL	1.604
Approximate Chi Square Value (.05)	122.2	95% Standard Bootstrap UCL	1.58
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	1.567
Adjusted Chi Square Value	118.5	95% Hall's Bootstrap UCL	1.614

Anderson-Darling Test Statistic	2.644	95% Percentile Bootstrap UCL	1.56
Anderson-Darling 5% Critical Value	0.731	95% BCA Bootstrap UCL	1.551
Kolmogorov-Smirnov Test Statistic	0.463	95% Chebyshev(Mean, Sd) UCL	1.91
Kolmogorov-Smirnov 5% Critical Value	0.246	97.5% Chebyshev(Mean, Sd) UCL	2.135
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	2.578
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.7		
95% Adjusted Gamma UCL	1.754		

Potential UCL to Use		Use 95% Student's-t UCL	1.604
		or 95% Modified-t UCL	1.602

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

Minimum	5.5	Log-transformed Statistics	
Maximum	17.3	Minimum of Log Data	1.705
Mean	10.81	Maximum of Log Data	2.851
Median	10.91	Mean of log Data	2.329
SD	3.554	SD of log Data	0.343
Coefficient of Variation	0.329		
Skewness	0.414		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.65	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.34
95% Adjusted-CLT UCL (Chen-1995)	12.63	95% Chebyshev (MVUE) UCL	15.56
95% Modified-t UCL (Johnson-1978)	12.67	97.5% Chebyshev (MVUE) UCL	17.6
		99% Chebyshev (MVUE) UCL	21.62

Gamma Distribution Test

k star (bias corrected)	7.414	Data Distribution	
Theta Star	1.458	Data appear Normal at 5% Significance Level	
MLE of Mean	10.81		
MLE of Standard Deviation	3.971		
nu star	177.9	Nonparametric Statistics	
Approximate Chi Square Value (.05)	148.1	95% CLT UCL	12.5
Adjusted Level of Significance	0.029	95% Jackknife UCL	12.65
Adjusted Chi Square Value	143.9	95% Standard Bootstrap UCL	12.43
		95% Bootstrap-t UCL	12.78
Anderson-Darling Test Statistic	0.489	95% Hall's Bootstrap UCL	13.33
Anderson-Darling 5% Critical Value	0.73	95% Percentile Bootstrap UCL	12.35
Kolmogorov-Smirnov Test Statistic	0.189	95% BCA Bootstrap UCL	12.59
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Chebyshev(Mean, Sd) UCL	15.28
Data appear Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	17.22
		99% Chebyshev(Mean, Sd) UCL	21.02

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.99
95% Adjusted Gamma UCL	13.37

Potential UCL to Use

Use 95% Student's-t UCL	12.65
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.52	Minimum of Log Data	-0.654
Maximum	1.1	Maximum of Log Data	0.0953
Mean	0.72	Mean of log Data	-0.344
Median	0.72	SD of log Data	0.182
SD	0.14		
Coefficient of Variation	0.195		
Skewness	1.618		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.657	Shapiro Wilk Test Statistic	0.701
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.793	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.797
95% Adjusted-CLT UCL (Chen-1995)	0.807	95% Chebyshev (MVUE) UCL	0.885
95% Modified-t UCL (Johnson-1978)	0.796	97.5% Chebyshev (MVUE) UCL	0.957
		99% Chebyshev (MVUE) UCL	1.098

Gamma Distribution Test

k star (bias corrected)	23.95	Data Distribution	
Theta Star	0.0301	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.72		
MLE of Standard Deviation	0.147		
nu star	574.9		
Approximate Chi Square Value (.05)	520.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.787
Adjusted Chi Square Value	512.3	95% Jackknife UCL	0.793
		95% Standard Bootstrap UCL	0.785
Anderson-Darling Test Statistic	2.031	95% Bootstrap-t UCL	0.815
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	1.166
Kolmogorov-Smirnov Test Statistic	0.393	95% Percentile Bootstrap UCL	0.785
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	0.798
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.897
		97.5% Chebyshev(Mean, Sd) UCL	0.973
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.123
95% Approximate Gamma UCL	0.796		
95% Adjusted Gamma UCL	0.808		

Potential UCL to Use

Use 95% Student's-t UCL	0.793
or 95% Modified-t UCL	0.796

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.067	Log-transformed Statistics	
Maximum	3.9	Minimum of Log Data	-2.703
Mean	1.439	Maximum of Log Data	1.361
Median	1.439	Mean of log Data	0.0736
SD	0.911	SD of log Data	1.017
Coefficient of Variation	0.633		
Skewness	1.593		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.664	Shapiro Wilk Test Statistic	0.638
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.911	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4.461
95% Adjusted-CLT UCL (Chen-1995)	2.001	95% Chebyshev (MVUE) UCL	4.037
95% Modified-t UCL (Johnson-1978)	1.931	97.5% Chebyshev (MVUE) UCL	5.047
		99% Chebyshev (MVUE) UCL	7.031

Gamma Distribution Test

k star (bias corrected)	1.459	Data Distribution	
Theta Star	0.986	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.439		
MLE of Standard Deviation	1.191		
nu star	35.02		
Approximate Chi Square Value (.05)	22.48	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.871
Adjusted Chi Square Value	20.96	95% Jackknife UCL	1.911
		95% Standard Bootstrap UCL	1.866
Anderson-Darling Test Statistic	2.084	95% Bootstrap-t UCL	2.05
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	4.357
Kolmogorov-Smirnov Test Statistic	0.43	95% Percentile Bootstrap UCL	1.873
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	1.964
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.585
		97.5% Chebyshev(Mean, Sd) UCL	3.081
		99% Chebyshev(Mean, Sd) UCL	4.055

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.242		
95% Adjusted Gamma UCL	2.404		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	2.585
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

Minimum	15.7	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.754
Mean	52.28	Maximum of Log Data	4.443
Median	46.3	Mean of log Data	3.868
SD	21.72	SD of log Data	0.464
Coefficient of Variation	0.415		
Skewness	0.516		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.847	Shapiro Wilk Test Statistic	0.85
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.54	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	71.46
95% Adjusted-CLT UCL (Chen-1995)	63.59	95% Chebyshev (MVUE) UCL	84.21
95% Modified-t UCL (Johnson-1978)	63.69	97.5% Chebyshev (MVUE) UCL	97.82
		99% Chebyshev (MVUE) UCL	124.5

Gamma Distribution Test

k star (bias corrected)	4.413	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	11.85		
MLE of Mean	52.28		
MLE of Standard Deviation	24.89		
nu star	105.9		
Approximate Chi Square Value (.05)	83.17	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	62.59
Adjusted Chi Square Value	80.1	95% Jackknife UCL	63.54
		95% Standard Bootstrap UCL	62.22
		95% Bootstrap-t UCL	64.79
		95% Hall's Bootstrap UCL	63.99
		95% Percentile Bootstrap UCL	62.43
		95% BCA Bootstrap UCL	63.22
		95% Chebyshev(Mean, Sd) UCL	79.61
		97.5% Chebyshev(Mean, Sd) UCL	91.43
		99% Chebyshev(Mean, Sd) UCL	114.7

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.779		
Anderson-Darling 5% Critical Value	0.732		
Kolmogorov-Smirnov Test Statistic	0.212		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data follow Appr. Gamma Distribution at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	66.58		
95% Adjusted Gamma UCL	69.13		

Potential UCL to Use

Use 95% Approximate Gamma UCL	66.58
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	8.5	Minimum of Log Data	2.14
Maximum	14	Maximum of Log Data	2.639
Mean	10.4	Mean of log Data	2.335
Median	10.4	SD of log Data	0.121
SD	1.33		
Coefficient of Variation	0.128		
Skewness	1.617		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.657	Shapiro Wilk Test Statistic	0.69
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.09	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.1
95% Adjusted-CLT UCL (Chen-1995)	11.22	95% Chebyshev (MVUE) UCL	11.98
95% Modified-t UCL (Johnson-1978)	11.12	97.5% Chebyshev (MVUE) UCL	12.66
		99% Chebyshev (MVUE) UCL	14.01

Gamma Distribution Test

k star (bias corrected)	54.42	Data Distribution	
Theta Star	0.191	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.4		
MLE of Standard Deviation	1.41		
nu star	1306		
Approximate Chi Square Value (.05)	1223	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.03
Adjusted Chi Square Value	1211	95% Jackknife UCL	11.09
		95% Standard Bootstrap UCL	11.01
Anderson-Darling Test Statistic	2.05	95% Bootstrap-t UCL	11.3
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	14.63
Kolmogorov-Smirnov Test Statistic	0.401	95% Percentile Bootstrap UCL	11
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	11.14
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.07
		97.5% Chebyshev(Mean, Sd) UCL	12.8
		99% Chebyshev(Mean, Sd) UCL	14.22

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.11		
95% Adjusted Gamma UCL	11.22		

Potential UCL to Use

Use 95% Student's-t UCL	11.09
or 95% Modified-t UCL	11.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	28.24	Log-transformed Statistics	
Maximum	218.2	Minimum of Log Data	3.341
Mean	93.8	Maximum of Log Data	5.385
Median	88.03	Mean of log Data	4.356
SD	60.2	SD of log Data	0.644
Coefficient of Variation	0.642		
Skewness	1.154		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	125	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	150.9
95% Adjusted-CLT UCL (Chen-1995)	128.6	95% Chebyshev (MVUE) UCL	173.1
95% Modified-t UCL (Johnson-1978)	126	97.5% Chebyshev (MVUE) UCL	207.2
		99% Chebyshev (MVUE) UCL	274.4

Gamma Distribution Test

k star (bias corrected)	2.2	Data Distribution	
Theta Star	42.63	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	93.8		
MLE of Standard Deviation	63.23		
nu star	52.81		
Approximate Chi Square Value (.05)	37.11	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	122.4
Adjusted Chi Square Value	35.11	95% Jackknife UCL	125

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.373	95% Standard Bootstrap UCL	120.7
Anderson-Darling 5% Critical Value	0.739	95% Bootstrap-t UCL	142.6
Kolmogorov-Smirnov Test Statistic	0.174	95% Hall's Bootstrap UCL	208.6
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Percentile Bootstrap UCL	123.3
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	128.5
		95% Chebyshev(Mean, Sd) UCL	169.5
		97.5% Chebyshev(Mean, Sd) UCL	202.3
		99% Chebyshev(Mean, Sd) UCL	266.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	133.5
95% Adjusted Gamma UCL	141.1

Potential UCL to Use

Use 95% Approximate Gamma UCL	133.5
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	8806	Log-transformed Statistics	
Maximum	66573	Minimum of Log Data	9.083
Mean	30602	Maximum of Log Data	11.11
Median	27486	Mean of log Data	10.18
SD	16869	SD of log Data	0.581
Coefficient of Variation	0.551		
Skewness	0.932		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.932	Shapiro Wilk Test Statistic	0.978
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	39348	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	46453
95% Adjusted-CLT UCL (Chen-1995)	40011	95% Chebyshev (MVUE) UCL	54104
95% Modified-t UCL (Johnson-1978)	39566	97.5% Chebyshev (MVUE) UCL	64167
		99% Chebyshev (MVUE) UCL	83936

Gamma Distribution Test

k star (bias corrected)	2.757	Data Distribution	
Theta Star	11098	Data appear Normal at 5% Significance Level	
MLE of Mean	30602		
MLE of Standard Deviation	18429		
nu star	66.18		
Approximate Chi Square Value (.05)	48.46	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	38612
Adjusted Chi Square Value	46.15	95% Jackknife UCL	39348
		95% Standard Bootstrap UCL	38361
		95% Bootstrap-t UCL	42713
		95% Hall's Bootstrap UCL	46103
		95% Percentile Bootstrap UCL	38896
		95% BCA Bootstrap UCL	40122
		95% Chebyshev(Mean, Sd) UCL	51829
		97.5% Chebyshev(Mean, Sd) UCL	61014
		99% Chebyshev(Mean, Sd) UCL	79056

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.16		
Anderson-Darling 5% Critical Value	0.737		
Kolmogorov-Smirnov Test Statistic	0.119		
Kolmogorov-Smirnov 5% Critical Value	0.247		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	41792		
95% Adjusted Gamma UCL	43881		

Potential UCL to Use

Use 95% Student's-t UCL	39348
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	300.9	Log-transformed Statistics	
Maximum	1758	Minimum of Log Data	5.707
Mean	770.3	Maximum of Log Data	7.472
Median	587.4	Mean of log Data	6.497
SD	467.1	SD of log Data	0.561
Coefficient of Variation	0.606		
Skewness	1.249		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1012	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1130
95% Adjusted-CLT UCL (Chen-1995)	1044	95% Chebyshev (MVUE) UCL	1320
95% Modified-t UCL (Johnson-1978)	1021	97.5% Chebyshev (MVUE) UCL	1561
		99% Chebyshev (MVUE) UCL	2033

Gamma Distribution Test

k star (bias corrected)	2.67	Data Distribution	
Theta Star	288.6	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	770.3		
MLE of Standard Deviation	471.5		
nu star	64.07		
Approximate Chi Square Value (.05)	46.65	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	992.1
Adjusted Chi Square Value	44.39	95% Jackknife UCL	1012
		95% Standard Bootstrap UCL	980.6
		95% Bootstrap-t UCL	1163
		95% Hall's Bootstrap UCL	1250
		95% Percentile Bootstrap UCL	998.7
		95% BCA Bootstrap UCL	1031
		95% Chebyshev(Mean, Sd) UCL	1358
		97.5% Chebyshev(Mean, Sd) UCL	1612
		99% Chebyshev(Mean, Sd) UCL	2112

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.349		
Anderson-Darling 5% Critical Value	0.737		
Kolmogorov-Smirnov Test Statistic	0.188		
Kolmogorov-Smirnov 5% Critical Value	0.247		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	1058		
95% Adjusted Gamma UCL	1112		

Potential UCL to Use

Use 95% Approximate Gamma UCL	1058
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.0114	Log-transformed Statistics	
Maximum	10.94	Minimum of Log Data	-4.474
Mean	8.017	Maximum of Log Data	2.392
Median	10	Mean of log Data	1.363
SD	3.844	SD of log Data	2.168
Coefficient of Variation	0.479		
Skewness	-1.76		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.647	Shapiro Wilk Test Statistic	0.526
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1332
95% Adjusted-CLT UCL (Chen-1995)	9.24	95% Chebyshev (MVUE) UCL	101.3
95% Modified-t UCL (Johnson-1978)	9.916	97.5% Chebyshev (MVUE) UCL	134
		99% Chebyshev (MVUE) UCL	198.2

Gamma Distribution Test

k star (bias corrected)	0.672	Data Distribution	
Theta Star	11.92	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.017		
MLE of Standard Deviation	9.777		
nu star	16.14	Nonparametric Statistics	
Approximate Chi Square Value (.05)	8.06	95% CLT UCL	9.842
Adjusted Level of Significance	0.029	95% Jackknife UCL	10.01
Adjusted Chi Square Value	7.205	95% Standard Bootstrap UCL	9.791

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.957	95% Bootstrap-t UCL	9.52
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	9.339
Kolmogorov-Smirnov Test Statistic	0.437	95% Percentile Bootstrap UCL	9.668
Kolmogorov-Smirnov 5% Critical Value	0.254	95% BCA Bootstrap UCL	9.345
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.85
		97.5% Chebyshev(Mean, Sd) UCL	14.95
		99% Chebyshev(Mean, Sd) UCL	19.06

Assuming Gamma Distribution

95% Approximate Gamma UCL	16.05
95% Adjusted Gamma UCL	17.96

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 99% Chebyshev (Mean, Sd) UCL	19.06
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0034	Minimum of Log Data	-5.684
Maximum	1.74	Maximum of Log Data	0.554
Mean	0.872	Mean of log Data	-0.542
Median	0.872	SD of log Data	1.631
SD	0.37		
Coefficient of Variation	0.425		
Skewness	-5E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.398
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.064	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17.12
95% Adjusted-CLT UCL (Chen-1995)	1.048	95% Chebyshev (MVUE) UCL	5.822
95% Modified-t UCL (Johnson-1978)	1.064	97.5% Chebyshev (MVUE) UCL	7.566
		99% Chebyshev (MVUE) UCL	10.99

Gamma Distribution Test

k star (bias corrected)	1.09	Data Distribution	
Theta Star	0.8	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.872		
MLE of Standard Deviation	0.835		
nu star	26.15		
Approximate Chi Square Value (.05)	15.49	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.048
Adjusted Chi Square Value	14.25	95% Jackknife UCL	1.064
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.424	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.53	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.338
		97.5% Chebyshev(Mean, Sd) UCL	1.539
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.935
95% Approximate Gamma UCL	1.471		
95% Adjusted Gamma UCL	1.599		

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 1.935
 Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	123.4	Log-transformed Statistics	
Maximum	697.1	Minimum of Log Data	4.816
Mean	366.8	Maximum of Log Data	6.547
Median	345.9	Mean of log Data	5.778
SD	184.9	SD of log Data	0.546
Coefficient of Variation	0.504		
Skewness	0.639		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	462.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	538.5
95% Adjusted-CLT UCL (Chen-1995)	465.1	95% Chebyshev (MVUE) UCL	630.9
95% Modified-t UCL (Johnson-1978)	464.3	97.5% Chebyshev (MVUE) UCL	743.9
		99% Chebyshev (MVUE) UCL	965.8

Gamma Distribution Test

k star (bias corrected)	3.136	Data Distribution	
Theta Star	117	Data appear Normal at 5% Significance Level	
MLE of Mean	366.8		
MLE of Standard Deviation	207.1		
nu star	75.27		
Approximate Chi Square Value (.05)	56.29	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	454.6
Adjusted Chi Square Value	53.79	95% Jackknife UCL	462.7
		95% Standard Bootstrap UCL	449.6
		95% Bootstrap-t UCL	479.8
		95% Hall's Bootstrap UCL	483.3
		95% Percentile Bootstrap UCL	452.3
		95% BCA Bootstrap UCL	456.9
		95% Chebyshev(Mean, Sd) UCL	599.5
		97.5% Chebyshev(Mean, Sd) UCL	700.2
		99% Chebyshev(Mean, Sd) UCL	898

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.268		
Anderson-Darling 5% Critical Value	0.735		
Kolmogorov-Smirnov Test Statistic	0.132		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	490.5		
95% Adjusted Gamma UCL	513.3		

Potential UCL to Use

Use 95% Student's-t UCL	462.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.37	Minimum of Log Data	-0.994
Maximum	10	Maximum of Log Data	2.303
Mean	4.67	Mean of log Data	1.31
Median	5	SD of log Data	0.893
SD	2.359		
Coefficient of Variation	0.505		
Skewness	0.189		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.729	Shapiro Wilk Test Statistic	0.632
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.893	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.52
95% Adjusted-CLT UCL (Chen-1995)	5.83	95% Chebyshev (MVUE) UCL	11.6
95% Modified-t UCL (Johnson-1978)	5.899	97.5% Chebyshev (MVUE) UCL	14.33
		99% Chebyshev (MVUE) UCL	19.7

Gamma Distribution Test

k star (bias corrected)	1.795	Data Distribution	
Theta Star	2.601	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.67		
MLE of Standard Deviation	3.485		
nu star	43.09		
Approximate Chi Square Value (.05)	29.04	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.79
Adjusted Chi Square Value	27.29	95% Jackknife UCL	5.893
		95% Standard Bootstrap UCL	5.762

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.179	95% Bootstrap-t UCL	5.883
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	6.177
Kolmogorov-Smirnov Test Statistic	0.421	95% Percentile Bootstrap UCL	5.806
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	5.833
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	7.639
		97.5% Chebyshev(Mean, Sd) UCL	8.924
		99% Chebyshev(Mean, Sd) UCL	11.45

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.93
95% Adjusted Gamma UCL	7.374

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 7.639

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.043	Log-transformed Statistics	
Maximum	12.87	Minimum of Log Data	-3.147
Mean	9.32	Maximum of Log Data	2.555
Median	10	Mean of log Data	1.86
SD	3.051	SD of log Data	1.579
Coefficient of Variation	0.327		
Skewness	-2.886		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.525	Shapiro Wilk Test Statistic	0.363
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	154.3
95% Adjusted-CLT UCL (Chen-1995)	9.985	95% Chebyshev (MVUE) UCL	58.82
95% Modified-t UCL (Johnson-1978)	10.78	97.5% Chebyshev (MVUE) UCL	76.27
		99% Chebyshev (MVUE) UCL	110.5

Gamma Distribution Test

k star (bias corrected)	1.173	Data Distribution	
Theta Star	7.948	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.32		
MLE of Standard Deviation	8.607	Nonparametric Statistics	
nu star	28.14	95% CLT UCL	10.77
Approximate Chi Square Value (.05)	17.04	95% Jackknife UCL	10.9
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	10.68
Adjusted Chi Square Value	15.73	95% Bootstrap-t UCL	10.38

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	10.2
Kolmogorov-Smirnov Test Statistic	0.525	95% Percentile Bootstrap UCL	10.42
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	10.23
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.16
		97.5% Chebyshev(Mean, Sd) UCL	14.82
		99% Chebyshev(Mean, Sd) UCL	18.08

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.39		
95% Adjusted Gamma UCL	16.67		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	18.08
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	1.57	Log-transformed Statistics	
Maximum	101	Minimum of Log Data	0.451
Mean	51.29	Maximum of Log Data	4.615
Median	51.29	Mean of log Data	3.703
SD	21.2	SD of log Data	1.043
Coefficient of Variation	0.413		
Skewness	1.8E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.435
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	62.27	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	179
95% Adjusted-CLT UCL (Chen-1995)	61.35	95% Chebyshev (MVUE) UCL	158
95% Modified-t UCL (Johnson-1978)	62.27	97.5% Chebyshev (MVUE) UCL	197.9
		99% Chebyshev (MVUE) UCL	276.5

Gamma Distribution Test

k star (bias corrected)	1.772	Data Distribution	
Theta Star	28.94	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	51.29		
MLE of Standard Deviation	38.52	Nonparametric Statistics	
nu star	42.54	95% CLT UCL	61.35
Approximate Chi Square Value (.05)	28.58	95% Jackknife UCL	62.27
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	N/A
Adjusted Chi Square Value	26.85	95% Bootstrap-t UCL	N/A
Anderson-Darling Test Statistic	3.148	95% Hall's Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.505	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Chebyshev(Mean, Sd) UCL	77.96
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	89.5
		99% Chebyshev(Mean, Sd) UCL	112.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	76.32		
95% Adjusted Gamma UCL	81.25		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	77.96
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.11	Log-transformed Statistics	
Maximum	0.42	Minimum of Log Data	-2.207
Mean	0.313	Maximum of Log Data	-0.868
Median	0.313	Mean of log Data	-1.201
SD	0.0751	SD of log Data	0.335
Coefficient of Variation	0.24		
Skewness	-1.619		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.657	Shapiro Wilk Test Statistic	0.549
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.352	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.388
95% Adjusted-CLT UCL (Chen-1995)	0.338	95% Chebyshev (MVUE) UCL	0.452
95% Modified-t UCL (Johnson-1978)	0.351	97.5% Chebyshev (MVUE) UCL	0.51
		99% Chebyshev (MVUE) UCL	0.625

Gamma Distribution Test

k star (bias corrected)	9.459	Data Distribution	
Theta Star	0.0331	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.313		
MLE of Standard Deviation	0.102		
nu star	227		
Approximate Chi Square Value (.05)	193.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.349
Adjusted Chi Square Value	188.4	95% Jackknife UCL	0.352
		95% Standard Bootstrap UCL	0.349
Anderson-Darling Test Statistic	2.384	95% Bootstrap-t UCL	0.345
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	0.343
Kolmogorov-Smirnov Test Statistic	0.454	95% Percentile Bootstrap UCL	0.346
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	0.338
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.408
		97.5% Chebyshev(Mean, Sd) UCL	0.449
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.529
95% Approximate Gamma UCL	0.368		
95% Adjusted Gamma UCL	0.378		

Potential UCL to Use

Use 95% Student's-t UCL	0.352
or 95% Modified-t UCL	0.351

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.92	Minimum of Log Data	-0.0834
Maximum	13.9	Maximum of Log Data	2.632
Mean	7.41	Mean of log Data	1.881
Median	7.41	SD of log Data	0.645
SD	2.767		
Coefficient of Variation	0.373		
Skewness	1.2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.483
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.845	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.71
95% Adjusted-CLT UCL (Chen-1995)	8.724	95% Chebyshev (MVUE) UCL	14.58
95% Modified-t UCL (Johnson-1978)	8.845	97.5% Chebyshev (MVUE) UCL	17.46
		99% Chebyshev (MVUE) UCL	23.12

Gamma Distribution Test

k star (bias corrected)	3.263	Data Distribution	
Theta Star	2.271	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.41		
MLE of Standard Deviation	4.102		
nu star	78.32		
Approximate Chi Square Value (.05)	58.93	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	8.724
Adjusted Chi Square Value	56.37	95% Jackknife UCL	8.845
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.943	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.89
		97.5% Chebyshev(Mean, Sd) UCL	12.4
		99% Chebyshev(Mean, Sd) UCL	15.36

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.848		
95% Adjusted Gamma UCL	10.3		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 10.89

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0082	Minimum of Log Data	-4.804
Maximum	0.121	Maximum of Log Data	-2.112
Mean	0.0646	Mean of log Data	-2.86
Median	0.0646	SD of log Data	0.638
SD	0.024		
Coefficient of Variation	0.372		
Skewness	-1E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.077	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.11
95% Adjusted-CLT UCL (Chen-1995)	0.076	95% Chebyshev (MVUE) UCL	0.126
95% Modified-t UCL (Johnson-1978)	0.077	97.5% Chebyshev (MVUE) UCL	0.151
		99% Chebyshev (MVUE) UCL	0.2

Gamma Distribution Test

k star (bias corrected)	3.309	Data Distribution	
Theta Star	0.0195	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0646		
MLE of Standard Deviation	0.0355		
nu star	79.4		
Approximate Chi Square Value (.05)	59.87	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.076
Adjusted Chi Square Value	57.29	95% Jackknife UCL	0.077
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.94	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.481	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0948
		97.5% Chebyshev(Mean, Sd) UCL	0.108
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.134
95% Approximate Gamma UCL	0.0856		
95% Adjusted Gamma UCL	0.0895		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.0948

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	24.32	Log-transformed Statistics	
Maximum	445	Minimum of Log Data	3.191
Mean	193.5	Maximum of Log Data	6.098
Median	159.9	Mean of log Data	5.004
SD	132.8	SD of log Data	0.825
Coefficient of Variation	0.686		
Skewness	0.762		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.927	Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	262.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	400.6
95% Adjusted-CLT UCL (Chen-1995)	265.5	95% Chebyshev (MVUE) UCL	423
95% Modified-t UCL (Johnson-1978)	263.7	97.5% Chebyshev (MVUE) UCL	518.6
		99% Chebyshev (MVUE) UCL	706.4

Gamma Distribution Test

k star (bias corrected)	1.604	Data Distribution	
Theta Star	120.6	Data appear Normal at 5% Significance Level	
MLE of Mean	193.5		
MLE of Standard Deviation	152.8		
nu star	38.5		
Approximate Chi Square Value (.05)	25.29	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	256.5
Adjusted Chi Square Value	23.67	95% Jackknife UCL	262.3
		95% Standard Bootstrap UCL	252.3
		95% Bootstrap-t UCL	281.3
		95% Hall's Bootstrap UCL	270.9
		95% Percentile Bootstrap UCL	257.1
		95% BCA Bootstrap UCL	263.9
		95% Chebyshev(Mean, Sd) UCL	360.6
		97.5% Chebyshev(Mean, Sd) UCL	432.8
		99% Chebyshev(Mean, Sd) UCL	574.8

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.14		
Anderson-Darling 5% Critical Value	0.741		
Kolmogorov-Smirnov Test Statistic	0.085		
Kolmogorov-Smirnov 5% Critical Value	0.248		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	294.6		
95% Adjusted Gamma UCL	314.8		

Potential UCL to Use

Use 95% Student's-t UCL	262.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.76	Log-transformed Statistics	
Maximum	52.2	Minimum of Log Data	-0.274
Mean	26.48	Maximum of Log Data	3.955
Median	26.48	Mean of log Data	3.037
SD	10.97	SD of log Data	1.061
Coefficient of Variation	0.414		
Skewness	6E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.433
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	32.17	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	96.35
95% Adjusted-CLT UCL (Chen-1995)	31.69	95% Chebyshev (MVUE) UCL	83.41
95% Modified-t UCL (Johnson-1978)	32.17	97.5% Chebyshev (MVUE) UCL	104.7
		99% Chebyshev (MVUE) UCL	146.4

Gamma Distribution Test

k star (bias corrected)	1.737	Data Distribution	
Theta Star	15.25	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	26.48		
MLE of Standard Deviation	20.09		
nu star	41.68		
Approximate Chi Square Value (.05)	27.88	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	31.69
Adjusted Chi Square Value	26.17	95% Jackknife UCL	32.17
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.157	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.505	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	40.28
		97.5% Chebyshev(Mean, Sd) UCL	46.25
		99% Chebyshev(Mean, Sd) UCL	57.98

Assuming Gamma Distribution

95% Approximate Gamma UCL	39.58		
95% Adjusted Gamma UCL	42.17		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	40.28
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.06	Minimum of Log Data	-2.813
Maximum	3.33	Maximum of Log Data	1.203
Mean	1.695	Mean of log Data	0.306
Median	1.695	SD of log Data	1.001
SD	0.697		
Coefficient of Variation	0.411		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.439
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.056
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	2.026
95% Modified-t UCL (Johnson-1978)	2.056

Assuming Lognormal Distribution

95% H-UCL	5.405
95% Chebyshev (MVUE) UCL	4.969
97.5% Chebyshev (MVUE) UCL	6.203
99% Chebyshev (MVUE) UCL	8.627

Gamma Distribution Test

k star (bias corrected)	1.859
Theta Star	0.912
MLE of Mean	1.695
MLE of Standard Deviation	1.243
nu star	44.61
Approximate Chi Square Value (.05)	30.29
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	28.5

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.127
Anderson-Darling 5% Critical Value	0.741
Kolmogorov-Smirnov Test Statistic	0.502
Kolmogorov-Smirnov 5% Critical Value	0.248

Nonparametric Statistics

95% CLT UCL	2.026
95% Jackknife UCL	2.056
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	2.572
97.5% Chebyshev(Mean, Sd) UCL	2.952
99% Chebyshev(Mean, Sd) UCL	3.697

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.496
95% Adjusted Gamma UCL	2.653

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.572

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.98	Minimum of Log Data	-0.0202
Maximum	94.2	Maximum of Log Data	4.545
Mean	47.59	Mean of log Data	3.596
Median	47.59	SD of log Data	1.156
SD	19.87		
Coefficient of Variation	0.418		
Skewness	-2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.425
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	57.89	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	217.1
95% Adjusted-CLT UCL (Chen-1995)	57.03	95% Chebyshev (MVUE) UCL	168.4
95% Modified-t UCL (Johnson-1978)	57.89	97.5% Chebyshev (MVUE) UCL	213
		99% Chebyshev (MVUE) UCL	300.5

Gamma Distribution Test

k star (bias corrected)	1.575	Data Distribution	
Theta Star	30.22	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	47.59		
MLE of Standard Deviation	37.92		
nu star	37.8		
Approximate Chi Square Value (.05)	24.72	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	57.03
Adjusted Chi Square Value	23.12	95% Jackknife UCL	57.89
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.204	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.51	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	72.6
		97.5% Chebyshev(Mean, Sd) UCL	83.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.7
95% Approximate Gamma UCL	72.77		
95% Adjusted Gamma UCL	77.81		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 72.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Minimum	28.4	Log-transformed Statistics	
Maximum	46.5	Minimum of Log Data	3.346
Mean	34.5	Maximum of Log Data	3.839
Median	34.5	Mean of log Data	3.534
SD	4.431	SD of log Data	0.121
Coefficient of Variation	0.128		
Skewness	1.624		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.652	Shapiro Wilk Test Statistic	0.684
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	36.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	36.84
95% Adjusted-CLT UCL (Chen-1995)	37.25	95% Chebyshev (MVUE) UCL	39.76
95% Modified-t UCL (Johnson-1978)	36.9	97.5% Chebyshev (MVUE) UCL	42.04
		99% Chebyshev (MVUE) UCL	46.52

Gamma Distribution Test

k star (bias corrected)	53.99	Data Distribution	
Theta Star	0.639	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	34.5		
MLE of Standard Deviation	4.695	Nonparametric Statistics	
nu star	1296	95% CLT UCL	36.6
Approximate Chi Square Value (.05)	1213	95% Jackknife UCL	36.8
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	36.53
Adjusted Chi Square Value	1201	95% Bootstrap-t UCL	37.5
Anderson-Darling Test Statistic	2.068	95% Hall's Bootstrap UCL	48.55
Anderson-Darling 5% Critical Value	0.73	95% Percentile Bootstrap UCL	36.52
Kolmogorov-Smirnov Test Statistic	0.401	95% BCA Bootstrap UCL	36.52
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Chebyshev(Mean, Sd) UCL	40.08
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	42.49
		99% Chebyshev(Mean, Sd) UCL	47.23

Assuming Gamma Distribution

95% Approximate Gamma UCL	36.85		
95% Adjusted Gamma UCL	37.22		

Potential UCL to Use

Use 95% Student's-t UCL	36.8
or 95% Modified-t UCL	36.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File
 Full Precision
 Confidence Coefficient
 Number of Bootstrap Operations

14-06.wst
 OFF
 95%
 2000

Americium-241

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum 0.23
 Maximum 2.7
 Mean 1.465
 Median 1.465
 SD 0.527
 Coefficient of Variation 0.359
 Skewness 1.7E-16

Log-transformed Statistics

Minimum of Log Data -1.47
 Maximum of Log Data 0.993
 Mean of log Data 0.279
 SD of log Data 0.578

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test
 Shapiro Wilk Test Statistic 0.6
 Shapiro Wilk Critical Value 0.859
 Data not Normal at 5% Significance Level
 Lognormal Distribution Test
 Shapiro Wilk Test Statistic 0.495
 Shapiro Wilk Critical Value 0.859
 Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 1.738
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 1.715
 95% Modified-t UCL (Johnson-1978) 1.738

Assuming Lognormal Distribution

95% H-UCL 2.307
 95% Chebyshev (MVUE) UCL 2.689
 97.5% Chebyshev (MVUE) UCL 3.187
 99% Chebyshev (MVUE) UCL 4.166

Gamma Distribution Test

k star (bias corrected) 3.805
 Theta Star 0.385
 MLE of Mean 1.465
 MLE of Standard Deviation 0.751
 nu star 91.31
 Approximate Chi Square Value (.05) 70.28
 Adjusted Level of Significance 0.029
 Adjusted Chi Square Value 67.47

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value 0.732
 Kolmogorov-Smirnov Test Statistic 0.476
 Kolmogorov-Smirnov 5% Critical Value 0.246
 Data not Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 1.715
 95% Jackknife UCL 1.738
 95% Standard Bootstrap UCL N/A
 95% Bootstrap-t UCL N/A
 95% Hall's Bootstrap UCL N/A
 95% Percentile Bootstrap UCL N/A
 95% BCA Bootstrap UCL N/A
 95% Chebyshev(Mean, Sd) UCL 2.128
 97.5% Chebyshev(Mean, Sd) UCL 2.414
 99% Chebyshev(Mean, Sd) UCL 2.978

Assuming Gamma Distribution

95% Approximate Gamma UCL 1.903
 95% Adjusted Gamma UCL 1.983

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.128

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	6.82	Log-transformed Statistics	
Maximum	11.31	Minimum of Log Data	1.92
Mean	9.571	Maximum of Log Data	2.426
Median	10.87	Mean of log Data	2.241
SD	1.8	SD of log Data	0.198
Coefficient of Variation	0.188		
Skewness	-0.458		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.757	Shapiro Wilk Test Statistic	0.763
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.71
95% Adjusted-CLT UCL (Chen-1995)	10.35	95% Chebyshev (MVUE) UCL	11.97
95% Modified-t UCL (Johnson-1978)	10.49	97.5% Chebyshev (MVUE) UCL	13.01
		99% Chebyshev (MVUE) UCL	15.04

Gamma Distribution Test

k star (bias corrected)	21.75	Data Distribution	
Theta Star	0.44	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.571		
MLE of Standard Deviation	2.052		
nu star	521.9		
Approximate Chi Square Value (.05)	470	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.43
Adjusted Chi Square Value	462.4	95% Jackknife UCL	10.5
		95% Standard Bootstrap UCL	10.4
		95% Bootstrap-t UCL	10.46
		95% Hall's Bootstrap UCL	10.28
		95% Percentile Bootstrap UCL	10.4
		95% BCA Bootstrap UCL	10.37
		95% Chebyshev(Mean, Sd) UCL	11.84
		97.5% Chebyshev(Mean, Sd) UCL	12.82
		99% Chebyshev(Mean, Sd) UCL	14.74

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.509		
Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.339		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.63		
95% Adjusted Gamma UCL	10.8		

Potential UCL to Use

		Use 95% Student's-t UCL	10.5
		or 95% Modified-t UCL	10.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.05	Log-transformed Statistics	
Maximum	0.84	Minimum of Log Data	-2.996
Mean	0.445	Maximum of Log Data	-0.174
Median	0.445	Mean of log Data	-0.939
SD	0.168	SD of log Data	0.673
Coefficient of Variation	0.378		
Skewness	-6E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.479
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.532	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.794
95% Adjusted-CLT UCL (Chen-1995)	0.525	95% Chebyshev (MVUE) UCL	0.902
95% Modified-t UCL (Johnson-1978)	0.532	97.5% Chebyshev (MVUE) UCL	1.085
		99% Chebyshev (MVUE) UCL	1.444

Gamma Distribution Test

k star (bias corrected)	3.077	Data Distribution	
Theta Star	0.145	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.445		
MLE of Standard Deviation	0.254	Nonparametric Statistics	
nu star	73.84	95% CLT UCL	0.525
Approximate Chi Square Value (.05)	55.05	95% Jackknife UCL	0.532
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	N/A
Adjusted Chi Square Value	52.58	95% Bootstrap-t UCL	N/A

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.958	95% Hall's Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.736	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.483	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Chebyshev(Mean, Sd) UCL	0.657
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	0.749
		99% Chebyshev(Mean, Sd) UCL	0.929

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.597
95% Adjusted Gamma UCL	0.625

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.657

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	13.1	Log-transformed Statistics	
Maximum	897.6	Minimum of Log Data	2.573
Mean	136.4	Maximum of Log Data	6.8
Median	85	Mean of log Data	4.325
SD	240.8	SD of log Data	0.951
Coefficient of Variation	1.766		
Skewness	3.405		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.413	Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	261.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	267.5
95% Adjusted-CLT UCL (Chen-1995)	323.8	95% Chebyshev (MVUE) UCL	257.2
95% Modified-t UCL (Johnson-1978)	272.6	97.5% Chebyshev (MVUE) UCL	319.6
		99% Chebyshev (MVUE) UCL	442.1

Gamma Distribution Test

k star (bias corrected)	0.791	Data Distribution	
Theta Star	172.5	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	136.4		
MLE of Standard Deviation	153.4		
nu star	18.98		
Approximate Chi Square Value (.05)	10.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	250.7
Adjusted Chi Square Value	9.126	95% Jackknife UCL	261.2

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.037	95% Standard Bootstrap UCL	248.9
Anderson-Darling 5% Critical Value	0.757	95% Bootstrap-t UCL	1077
Kolmogorov-Smirnov Test Statistic	0.45	95% Hall's Bootstrap UCL	1104
Kolmogorov-Smirnov 5% Critical Value	0.253	95% Percentile Bootstrap UCL	275
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	344.5
		95% Chebyshev(Mean, Sd) UCL	439.4
		97.5% Chebyshev(Mean, Sd) UCL	570.6
		99% Chebyshev(Mean, Sd) UCL	828.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	256.2		
95% Adjusted Gamma UCL	283.6		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	439.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt-60

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	21.45	Minimum of Log Data	3.066
Maximum	207.4	Maximum of Log Data	5.334
Mean	92.47	Mean of log Data	4.341
Median	78.97	SD of log Data	0.659
SD	57.52		
Coefficient of Variation	0.622		
Skewness	0.932		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.972
Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	122.3	95% H-UCL	152.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	173.9
95% Adjusted-CLT UCL (Chen-1995)	124.6	97.5% Chebyshev (MVUE) UCL	208.7
95% Modified-t UCL (Johnson-1978)	123	99% Chebyshev (MVUE) UCL	277
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.194	Data appear Normal at 5% Significance Level	
Theta Star	42.15		
MLE of Mean	92.47		
MLE of Standard Deviation	62.43		
nu star	52.64		
Approximate Chi Square Value (.05)	36.98	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	119.8
Adjusted Chi Square Value	34.98	95% Jackknife UCL	122.3
		95% Standard Bootstrap UCL	118.7
Anderson-Darling Test Statistic	0.218	95% Bootstrap-t UCL	131.9
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	132
Kolmogorov-Smirnov Test Statistic	0.13	95% Percentile Bootstrap UCL	118.2
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	125.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	164.8
		97.5% Chebyshev(Mean, Sd) UCL	196.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	257.7
95% Approximate Gamma UCL	131.6		
95% Adjusted Gamma UCL	139.2		
Potential UCL to Use		Use 95% Student's-t UCL	122.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	279.7	Log-transformed Statistics	
Maximum	933.3	Minimum of Log Data	5.634
Mean	548.3	Maximum of Log Data	6.839
Median	516.6	Mean of log Data	6.243
SD	204.9	SD of log Data	0.376
Coefficient of Variation	0.374		
Skewness	0.653		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Test Statistic	0.966
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	654.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	692.4
95% Adjusted-CLT UCL (Chen-1995)	657.5	95% Chebyshev (MVUE) UCL	811.5
95% Modified-t UCL (Johnson-1978)	656.4	97.5% Chebyshev (MVUE) UCL	925.3
		99% Chebyshev (MVUE) UCL	1149

Gamma Distribution Test

k star (bias corrected)	6.049	Data Distribution	
Theta Star	90.65	Data appear Normal at 5% Significance Level	
MLE of Mean	548.3		
MLE of Standard Deviation	222.9		
nu star	145.2		
Approximate Chi Square Value (.05)	118.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	645.6
Adjusted Chi Square Value	114.6	95% Jackknife UCL	654.5
		95% Standard Bootstrap UCL	641.7

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.218	95% Bootstrap-t UCL	685.1
Kolmogorov-Smirnov Test Statistic	0.731	95% Hall's Bootstrap UCL	687.5
Kolmogorov-Smirnov 5% Critical Value	0.126	95% Percentile Bootstrap UCL	649.3
Data appear Gamma Distributed at 5% Significance Level	0.246	95% BCA Bootstrap UCL	653.4
		95% Chebyshev(Mean, Sd) UCL	806.1
		97.5% Chebyshev(Mean, Sd) UCL	917.6
		99% Chebyshev(Mean, Sd) UCL	1137

Assuming Gamma Distribution

95% Approximate Gamma UCL	672.7
95% Adjusted Gamma UCL	694.4

Potential UCL to Use

Use 95% Student's-t UCL	654.5
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0496	Minimum of Log Data	-3.004
Maximum	10	Maximum of Log Data	2.303
Mean	8.366	Mean of log Data	1.58
Median	10	SD of log Data	1.737
SD	3.816		
Coefficient of Variation	0.456		
Skewness	-2.057		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.468	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.34
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9.48
95% Modified-t UCL (Johnson-1978)	10.24

Assuming Lognormal Distribution

95% H-UCL	219.4
95% Chebyshev (MVUE) UCL	58.29
97.5% Chebyshev (MVUE) UCL	76.07
99% Chebyshev (MVUE) UCL	111

Gamma Distribution Test

k star (bias corrected)	0.847
Theta Star	9.882
MLE of Mean	8.366
MLE of Standard Deviation	9.093
nu star	20.32
Approximate Chi Square Value (.05)	11.09
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	10.06

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	10.18
95% Jackknife UCL	10.34
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	13.17
97.5% Chebyshev(Mean, Sd) UCL	15.25
99% Chebyshev(Mean, Sd) UCL	19.33

Anderson-Darling Test Statistic	3.508
Anderson-Darling 5% Critical Value	0.756
Kolmogorov-Smirnov Test Statistic	0.529
Kolmogorov-Smirnov 5% Critical Value	0.252
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.33
95% Adjusted Gamma UCL	16.9

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 99% Chebyshev (Mean, Sd) UCL	19.33
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.01	Minimum of Log Data	-4.605
Maximum	2.65	Maximum of Log Data	0.975
Mean	1.33	Mean of log Data	-0.0649
Median	1.33	SD of log Data	1.443
SD	0.563		
Coefficient of Variation	0.423		
Skewness	5.4E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.407
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.622
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.597
95% Modified-t UCL (Johnson-1978)	1.622

Assuming Lognormal Distribution

95% H-UCL	13.76
95% Chebyshev (MVUE) UCL	6.849
97.5% Chebyshev (MVUE) UCL	8.821
99% Chebyshev (MVUE) UCL	12.69

Gamma Distribution Test

k star (bias corrected)	1.236
Theta Star	1.076
MLE of Mean	1.33
MLE of Standard Deviation	1.196
nu star	29.67
Approximate Chi Square Value (.05)	18.23
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	16.88

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.597
95% Jackknife UCL	1.622
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	2.038
97.5% Chebyshev(Mean, Sd) UCL	2.345
99% Chebyshev(Mean, Sd) UCL	2.947

Anderson-Darling Test Statistic	3.34
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.522
Kolmogorov-Smirnov 5% Critical Value	0.249
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.164
95% Adjusted Gamma UCL	2.338

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.038

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	175.8	Log-transformed Statistics	
Maximum	1623	Minimum of Log Data	5.17
Mean	730.6	Maximum of Log Data	7.392
Median	653.8	Mean of log Data	6.393
SD	448.9	SD of log Data	0.696
Coefficient of Variation	0.614		
Skewness	0.582		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.937	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	963.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1261
95% Adjusted-CLT UCL (Chen-1995)	967	95% Chebyshev (MVUE) UCL	1421
95% Modified-t UCL (Johnson-1978)	967	97.5% Chebyshev (MVUE) UCL	1714
		99% Chebyshev (MVUE) UCL	2290

Gamma Distribution Test

k star (bias corrected)	2.04	Data Distribution	
Theta Star	358.1	Data appear Normal at 5% Significance Level	
MLE of Mean	730.6		
MLE of Standard Deviation	511.5		
nu star	48.97		
Approximate Chi Square Value (.05)	33.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	943.8
Adjusted Chi Square Value	32	95% Jackknife UCL	963.3
		95% Standard Bootstrap UCL	934.8

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.273	95% Bootstrap-t UCL	999.6
Kolmogorov-Smirnov Test Statistic	0.74	95% Hall's Bootstrap UCL	973.2
Kolmogorov-Smirnov 5% Critical Value	0.141	95% Percentile Bootstrap UCL	936.9
Data appear Gamma Distributed at 5% Significance Level	0.248	95% BCA Bootstrap UCL	955.7
		95% Chebyshev(Mean, Sd) UCL	1295
		97.5% Chebyshev(Mean, Sd) UCL	1540
		99% Chebyshev(Mean, Sd) UCL	2020

Assuming Gamma Distribution

95% Approximate Gamma UCL	1055
95% Adjusted Gamma UCL	1118

Potential UCL to Use

Use 95% Student's-t UCL	963.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.33	Minimum of Log Data	-1.109
Maximum	5	Maximum of Log Data	1.609
Mean	4.25	Mean of log Data	1.215
Median	5	SD of log Data	0.932
SD	1.753		
Coefficient of Variation	0.412		
Skewness	-2.063		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.486
Shapiro Wilk Test Statistic	0.472	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	5.159	95% H-UCL	11.43
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.16
95% Adjusted-CLT UCL (Chen-1995)	4.76	97.5% Chebyshev (MVUE) UCL	13.84
95% Modified-t UCL (Johnson-1978)	5.109	99% Chebyshev (MVUE) UCL	19.11

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.79	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.374		
MLE of Mean	4.25	Nonparametric Statistics	
MLE of Standard Deviation	3.176	95% CLT UCL	5.082
nu star	42.97	95% Jackknife UCL	5.159
Approximate Chi Square Value (.05)	28.94	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	27.19	95% Hall's Bootstrap UCL	N/A

Anderson-Darling Test Statistic	3.391	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.515	95% Chebyshev(Mean, Sd) UCL	6.456
Kolmogorov-Smirnov 5% Critical Value	0.248	97.5% Chebyshev(Mean, Sd) UCL	7.41
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	9.285

Assuming Gamma Distribution			
95% Approximate Gamma UCL	6.31		
95% Adjusted Gamma UCL	6.716		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	6.456
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.066	Minimum of Log Data	-2.718
Maximum	16.63	Maximum of Log Data	2.811
Mean	9.962	Mean of log Data	1.947
Median	10	SD of log Data	1.478
SD	3.728		
Coefficient of Variation	0.374		
Skewness	-1.345		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.686	Shapiro Wilk Test Statistic	0.408
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	11.9	95% H-UCL	116.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	54.19
95% Adjusted-CLT UCL (Chen-1995)	11.29	97.5% Chebyshev (MVUE) UCL	69.92
95% Modified-t UCL (Johnson-1978)	11.83	99% Chebyshev (MVUE) UCL	100.8
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.23	Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.098		
MLE of Mean	9.962	Nonparametric Statistics	
MLE of Standard Deviation	8.982	95% CLT UCL	11.73
nu star	29.53	95% Jackknife UCL	11.9
Approximate Chi Square Value (.05)	18.12	95% Standard Bootstrap UCL	11.71
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	11.52
Adjusted Chi Square Value	16.77	95% Hall's Bootstrap UCL	11.66
Anderson-Darling Test Statistic	3.167	95% Percentile Bootstrap UCL	11.6
Anderson-Darling 5% Critical Value	0.745	95% BCA Bootstrap UCL	11.33
Kolmogorov-Smirnov Test Statistic	0.508	95% Chebyshev(Mean, Sd) UCL	14.65
Kolmogorov-Smirnov 5% Critical Value	0.249	97.5% Chebyshev(Mean, Sd) UCL	16.68
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	20.67
Assuming Gamma Distribution			
95% Approximate Gamma UCL	16.23		
95% Adjusted Gamma UCL	17.54		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	14.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	146.4	Log-transformed Statistics	
Maximum	864.7	Minimum of Log Data	4.986
Mean	411.4	Maximum of Log Data	6.762
Median	320	Mean of log Data	5.85
SD	256.4	SD of log Data	0.602
Coefficient of Variation	0.623		
Skewness	0.931		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	544.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	629.3
95% Adjusted-CLT UCL (Chen-1995)	554.4	95% Chebyshev (MVUE) UCL	729.7
95% Modified-t UCL (Johnson-1978)	547.7	97.5% Chebyshev (MVUE) UCL	868.3
		99% Chebyshev (MVUE) UCL	1141

Gamma Distribution Test

k star (bias corrected)	2.384	Data Distribution	
Theta Star	172.6	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	411.4		
MLE of Standard Deviation	266.4		
nu star	57.22		
Approximate Chi Square Value (.05)	40.84	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	533.2
Adjusted Chi Square Value	38.73	95% Jackknife UCL	544.4
		95% Standard Bootstrap UCL	526.5

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.47	95% Bootstrap-t UCL	591.6
Kolmogorov-Smirnov Test Statistic	0.739	95% Hall's Bootstrap UCL	546.1
Kolmogorov-Smirnov 5% Critical Value	0.151	95% Percentile Bootstrap UCL	532.9
Data appear Gamma Distributed at 5% Significance Level	0.247	95% BCA Bootstrap UCL	542.6
		95% Chebyshev(Mean, Sd) UCL	734.1
		97.5% Chebyshev(Mean, Sd) UCL	873.7
		99% Chebyshev(Mean, Sd) UCL	1148

Assuming Gamma Distribution

95% Approximate Gamma UCL	576.5
95% Adjusted Gamma UCL	607.9

Potential UCL to Use

Use 95% Approximate Gamma UCL 576.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	13.1	Minimum of Log Data	2.573
Maximum	34.1	Maximum of Log Data	3.529
Mean	23.6	Mean of log Data	3.143
Median	23.6	SD of log Data	0.208
SD	4.477		
Coefficient of Variation	0.19		
Skewness	2.2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.574
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	25.92	95% H-UCL	26.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29.86
95% Adjusted-CLT UCL (Chen-1995)	25.73	97.5% Chebyshev (MVUE) UCL	32.56
95% Modified-t UCL (Johnson-1978)	25.92	99% Chebyshev (MVUE) UCL	37.85

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	20.58	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.147		
MLE of Mean	23.6	Nonparametric Statistics	
MLE of Standard Deviation	5.202	95% CLT UCL	25.73
nu star	493.9	95% Jackknife UCL	25.92
Approximate Chi Square Value (.05)	443.4	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	436.1	95% Hall's Bootstrap UCL	N/A

Anderson-Darling Test Statistic	2.748	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.442	95% Chebyshev(Mean, Sd) UCL	29.23
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	31.67
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	36.46

Assuming Gamma Distribution	
95% Approximate Gamma UCL	26.29
95% Adjusted Gamma UCL	26.73

Potential UCL to Use	Use 95% Student's-t UCL	25.92
	or 95% Modified-t UCL	25.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1.03	Minimum of Log Data	0.0296
Maximum	2.27	Maximum of Log Data	0.82
Mean	1.65	Mean of log Data	0.488
Median	1.65	SD of log Data	0.171
SD	0.264		
Coefficient of Variation	0.16		
Skewness	4.4E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.582
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.787
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.776
95% Modified-t UCL (Johnson-1978)	1.787

Assuming Lognormal Distribution

95% H-UCL	1.816
95% Chebyshev (MVUE) UCL	2.008
97.5% Chebyshev (MVUE) UCL	2.162
99% Chebyshev (MVUE) UCL	2.465

Gamma Distribution Test

k star (bias corrected)	29.74
Theta Star	0.0555
MLE of Mean	1.65
MLE of Standard Deviation	0.303
nu star	713.9
Approximate Chi Square Value (.05)	652.9
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	644

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.776
95% Jackknife UCL	1.787
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	1.983
97.5% Chebyshev(Mean, Sd) UCL	2.127
99% Chebyshev(Mean, Sd) UCL	2.409

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.737
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.438
Kolmogorov-Smirnov 5% Critical Value	0.245
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.804
95% Adjusted Gamma UCL	1.829

Potential UCL to Use

Use 95% Student's-t UCL	1.787
or 95% Modified-t UCL	1.787

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	25.9	Minimum of Log Data	3.254
Maximum	50.8	Maximum of Log Data	3.928
Mean	38.35	Mean of log Data	3.637
Median	38.35	SD of log Data	0.145
SD	5.309		
Coefficient of Variation	0.138		
Skewness	2.5E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.586
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	41.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	40.87
95% Modified-t UCL (Johnson-1978)	41.1

Assuming Lognormal Distribution

95% H-UCL	41.56
95% Chebyshev (MVUE) UCL	45.39
97.5% Chebyshev (MVUE) UCL	48.43
99% Chebyshev (MVUE) UCL	54.41

Gamma Distribution Test

k star (bias corrected)	40.59
Theta Star	0.945
MLE of Mean	38.35
MLE of Standard Deviation	6.02
nu star	974.1
Approximate Chi Square Value (.05)	902.6
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	892.1

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	40.87
95% Jackknife UCL	41.1
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	45.03
97.5% Chebyshev(Mean, Sd) UCL	47.92
99% Chebyshev(Mean, Sd) UCL	53.6

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.731
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.435
Kolmogorov-Smirnov 5% Critical Value	0.245
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	41.39
95% Adjusted Gamma UCL	41.87

Potential UCL to Use

Use 95% Student's-t UCL	41.1
or 95% Modified-t UCL	41.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 14-07.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Antimony

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	0.37	Log-transformed Statistics	
Maximum	0.75	Minimum of Log Data	-0.994
Mean	0.56	Maximum of Log Data	-0.288
Median	0.56	Mean of log Data	-0.59
SD	0.081	SD of log Data	0.153
Coefficient of Variation	0.145		
Skewness	-2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.585
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.602	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.609
95% Adjusted-CLT UCL (Chen-1995)	0.598	95% Chebyshev (MVUE) UCL	0.668
95% Modified-t UCL (Johnson-1978)	0.602	97.5% Chebyshev (MVUE) UCL	0.715
		99% Chebyshev (MVUE) UCL	0.806

Gamma Distribution Test

k star (bias corrected) 36.98 Data do not follow a Discernable Distribution (0.05)

Theta Star	0.0151	Nonparametric Statistics	
MLE of Mean	0.56	95% CLT UCL	0.598
MLE of Standard Deviation	0.0921	95% Jackknife UCL	0.602
nu star	887.4	95% Standard Bootstrap UCL	N/A
Approximate Chi Square Value (.05)	819.3	95% Bootstrap-t UCL	N/A
Adjusted Level of Significance	0.029	95% Hall's Bootstrap UCL	N/A
Adjusted Chi Square Value	809.3	95% Percentile Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.733	95% BCA Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Chebyshev(Mean, Sd) UCL	0.662
Kolmogorov-Smirnov Test Statistic	0.436	97.5% Chebyshev(Mean, Sd) UCL	0.706
Kolmogorov-Smirnov 5% Critical Value	0.245	99% Chebyshev(Mean, Sd) UCL	0.793
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.607
95% Adjusted Gamma UCL	0.614

Potential UCL to Use

Use 95% Student's-t UCL 0.602
 or 95% Modified-t UCL 0.602

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	8
Raw Statistics		Log-transformed Statistics	
Minimum	7.19	Minimum of Log Data	1.973
Maximum	12.99	Maximum of Log Data	2.564
Mean	10.32	Mean of log Data	2.32
Median	11	SD of log Data	0.182
SD	1.751		
Coefficient of Variation	0.17		
Skewness	-0.575		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	11.23	95% H-UCL	11.43
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.7
95% Adjusted-CLT UCL (Chen-1995)	11.06	97.5% Chebyshev (MVUE) UCL	13.72
95% Modified-t UCL (Johnson-1978)	11.21	99% Chebyshev (MVUE) UCL	15.74
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	26.15	Data appear Normal at 5% Significance Level	
Theta Star	0.395		
MLE of Mean	10.32		
MLE of Standard Deviation	2.018		
nu star	627.6		
Approximate Chi Square Value (.05)	570.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.15
Adjusted Chi Square Value	562.2	95% Jackknife UCL	11.23
		95% Standard Bootstrap UCL	11.14
		95% Bootstrap-t UCL	11.11
Anderson-Darling Test Statistic	0.664	95% Hall's Bootstrap UCL	11.11
Anderson-Darling 5% Critical Value	0.731	95% Percentile Bootstrap UCL	11.09
Kolmogorov-Smirnov Test Statistic	0.252	95% BCA Bootstrap UCL	11.05
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Chebyshev(Mean, Sd) UCL	12.52
Data follow Appr. Gamma Distribution at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	13.48
		99% Chebyshev(Mean, Sd) UCL	15.35
Assuming Gamma Distribution			
95% Approximate Gamma UCL	11.35		
95% Adjusted Gamma UCL	11.52		
Potential UCL to Use		Use 95% Student's-t UCL	11.23

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	2.7	Maximum of Log Data	0.993
Mean	1.425	Mean of log Data	0.22
Median	1.425	SD of log Data	0.692
SD	0.544		
Coefficient of Variation	0.382		
Skewness	-3E-15		

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 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.476
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.707
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.683
95% Modified-t UCL (Johnson-1978)	1.707

Assuming Lognormal Distribution

95% H-UCL	2.611
95% Chebyshev (MVUE) UCL	2.946
97.5% Chebyshev (MVUE) UCL	3.552
99% Chebyshev (MVUE) UCL	4.742

Gamma Distribution Test

k star (bias corrected)	2.966
Theta Star	0.48
MLE of Mean	1.425
MLE of Standard Deviation	0.827
nu star	71.18
Approximate Chi Square Value (.05)	52.76
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	50.34

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.683
95% Jackknife UCL	1.707
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	2.109
97.5% Chebyshev(Mean, Sd) UCL	2.405
99% Chebyshev(Mean, Sd) UCL	2.987

Anderson-Darling Test Statistic	2.968
Anderson-Darling 5% Critical Value	0.736
Kolmogorov-Smirnov Test Statistic	0.484
Kolmogorov-Smirnov 5% Critical Value	0.247
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.923
95% Adjusted Gamma UCL	2.015

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.109

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	18.1	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.896
Mean	58.1	Maximum of Log Data	4.443
Median	56.89	Mean of log Data	3.946
SD	26.24	SD of log Data	0.532
Coefficient of Variation	0.452		
Skewness	-0.142		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.862
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	71.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	84.63
95% Adjusted-CLT UCL (Chen-1995)	70.22	95% Chebyshev (MVUE) UCL	99.32
95% Modified-t UCL (Johnson-1978)	71.65	97.5% Chebyshev (MVUE) UCL	116.8
		99% Chebyshev (MVUE) UCL	151.2

Gamma Distribution Test

k star (bias corrected)	3.418	Data Distribution	
Theta Star	17	Data appear Lognormal at 5% Significance Level	
MLE of Mean	58.1		
MLE of Standard Deviation	31.43		
nu star	82.03		
Approximate Chi Square Value (.05)	62.16	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	70.56
Adjusted Chi Square Value	59.52	95% Jackknife UCL	71.7
		95% Standard Bootstrap UCL	70.07
		95% Bootstrap-t UCL	71.19
		95% Hall's Bootstrap UCL	69.35
		95% Percentile Bootstrap UCL	70.15
		95% BCA Bootstrap UCL	69.62
		95% Chebyshev(Mean, Sd) UCL	91.11
		97.5% Chebyshev(Mean, Sd) UCL	105.4
		99% Chebyshev(Mean, Sd) UCL	133.5

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.746		
Anderson-Darling 5% Critical Value	0.734		
Kolmogorov-Smirnov Test Statistic	0.261		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data not Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution			
95% Approximate Gamma UCL	76.67		
95% Adjusted Gamma UCL	80.06		

Potential UCL to Use

Use 95% H-UCL 84.63

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	17.48	Log-transformed Statistics	
Maximum	944	Minimum of Log Data	2.861
Mean	102	Maximum of Log Data	6.85
Median	25.54	Mean of log Data	3.505
SD	265.3	SD of log Data	1.085
Coefficient of Variation	2.6		
Skewness	3.459		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.35	Shapiro Wilk Test Statistic	0.538
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	239.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	163.7
95% Adjusted-CLT UCL (Chen-1995)	309.7	95% Chebyshev (MVUE) UCL	138.1
95% Modified-t UCL (Johnson-1978)	252.3	97.5% Chebyshev (MVUE) UCL	173.6
		99% Chebyshev (MVUE) UCL	243.5

Gamma Distribution Test

k star (bias corrected)	0.474	Data Distribution	
Theta Star	215.3	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	102		
MLE of Standard Deviation	148.2		
nu star	11.37	Nonparametric Statistics	
Approximate Chi Square Value (.05)	4.817	95% CLT UCL	228
Adjusted Level of Significance	0.029	95% Jackknife UCL	239.5
Adjusted Chi Square Value	4.185	95% Standard Bootstrap UCL	222.8

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.78	95% Bootstrap-t UCL	5803
Kolmogorov-Smirnov Test Statistic	0.453	95% Hall's Bootstrap UCL	2258
Kolmogorov-Smirnov 5% Critical Value	0.258	95% Percentile Bootstrap UCL	254.7
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	332.3
		95% Chebyshev(Mean, Sd) UCL	435.8
		97.5% Chebyshev(Mean, Sd) UCL	580.2
		99% Chebyshev(Mean, Sd) UCL	863.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	240.9		
95% Adjusted Gamma UCL	277.3		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 435.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	280.3	Log-transformed Statistics	
Maximum	909.3	Minimum of Log Data	5.636
Mean	473.6	Maximum of Log Data	6.813
Median	392.5	Mean of log Data	6.076
SD	213.8	SD of log Data	0.417
Coefficient of Variation	0.451		
Skewness	1.015		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	584.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	614.2
95% Adjusted-CLT UCL (Chen-1995)	594.5	95% Chebyshev (MVUE) UCL	722.9
95% Modified-t UCL (Johnson-1978)	587.5	97.5% Chebyshev (MVUE) UCL	831.7
		99% Chebyshev (MVUE) UCL	1046

Gamma Distribution Test

k star (bias corrected)	4.64	Data Distribution	
Theta Star	102.1	Data appear Gamma Distributed at 5% Significance Level	

MLE of Mean

MLE of Mean	473.6		
MLE of Standard Deviation	219.9		
nu star	111.4	Nonparametric Statistics	
Approximate Chi Square Value (.05)	88.01	95% CLT UCL	575.2
Adjusted Level of Significance	0.029	95% Jackknife UCL	584.5
Adjusted Chi Square Value	84.84	95% Standard Bootstrap UCL	570.3

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.634	95% Bootstrap-t UCL	616.1
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	578.8
Kolmogorov-Smirnov Test Statistic	0.197	95% Percentile Bootstrap UCL	576.3
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	596.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	742.7
		97.5% Chebyshev(Mean, Sd) UCL	859.1
		99% Chebyshev(Mean, Sd) UCL	1088

Assuming Gamma Distribution

95% Approximate Gamma UCL	599.4		
95% Adjusted Gamma UCL	621.7		

Potential UCL to Use

Use 95% Approximate Gamma UCL	599.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.0287	Minimum of Log Data	-3.551
Maximum	10	Maximum of Log Data	2.303
Mean	8.189	Mean of log Data	1.531
Median	10	SD of log Data	1.839
SD	3.773		
Coefficient of Variation	0.461		
Skewness	-1.947		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.535	Shapiro Wilk Test Statistic	0.501
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.15
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9.326
95% Modified-t UCL (Johnson-1978)	10.04

Assuming Lognormal Distribution

95% H-UCL	323.1
95% Chebyshev (MVUE) UCL	66.23
97.5% Chebyshev (MVUE) UCL	86.75
99% Chebyshev (MVUE) UCL	127.1

Gamma Distribution Test

k star (bias corrected)	0.811
Theta Star	10.09
MLE of Mean	8.189
MLE of Standard Deviation	9.092
nu star	19.47
Approximate Chi Square Value (.05)	10.46
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	9.47

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	9.981
95% Jackknife UCL	10.15
95% Standard Bootstrap UCL	9.838
95% Bootstrap-t UCL	9.517
95% Hall's Bootstrap UCL	9.462
95% Percentile Bootstrap UCL	9.818
95% BCA Bootstrap UCL	9.202
95% Chebyshev(Mean, Sd) UCL	12.94
97.5% Chebyshev(Mean, Sd) UCL	14.99
99% Chebyshev(Mean, Sd) UCL	19.03

Anderson-Darling Test Statistic	3.207
Anderson-Darling 5% Critical Value	0.757
Kolmogorov-Smirnov Test Statistic	0.455
Kolmogorov-Smirnov 5% Critical Value	0.252
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.24
95% Adjusted Gamma UCL	16.84

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 19.03

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.07	Minimum of Log Data	-2.659
Maximum	1.49	Maximum of Log Data	0.399
Mean	0.78	Mean of log Data	-0.395
Median	0.78	SD of log Data	0.737
SD	0.303		
Coefficient of Variation	0.388		
Skewness	-2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
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It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.469
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.937	95% H-UCL	1.529
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.693
95% Adjusted-CLT UCL (Chen-1995)	0.924	97.5% Chebyshev (MVUE) UCL	2.054
95% Modified-t UCL (Johnson-1978)	0.937	99% Chebyshev (MVUE) UCL	2.762
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.726	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.286		
MLE of Mean	0.78	Nonparametric Statistics	
MLE of Standard Deviation	0.472	95% CLT UCL	0.924
nu star	65.42	95% Jackknife UCL	0.937
Approximate Chi Square Value (.05)	47.81	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	45.52	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.991	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.487	95% Chebyshev(Mean, Sd) UCL	1.161
Kolmogorov-Smirnov 5% Critical Value	0.247	97.5% Chebyshev(Mean, Sd) UCL	1.326
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	1.65
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.067		
95% Adjusted Gamma UCL	1.121		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	1.161

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	84.54	Minimum of Log Data	4.437
Maximum	2668	Maximum of Log Data	7.889
Mean	670.3	Mean of log Data	5.972
Median	325.6	SD of log Data	1.055
SD	799.7		
Coefficient of Variation	1.193		
Skewness	1.919		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.723	Shapiro Wilk Critical Value	0.966
Shapiro Wilk Critical Value	0.859		0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1085	95% H-UCL	1785
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1556
95% Adjusted-CLT UCL (Chen-1995)	1187	97.5% Chebyshev (MVUE) UCL	1951
95% Modified-t UCL (Johnson-1978)	1106	99% Chebyshev (MVUE) UCL	2728
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.858	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	781.7		
MLE of Mean	670.3		
MLE of Standard Deviation	723.9		
nu star	20.58		
Approximate Chi Square Value (.05)	11.28	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1050
Adjusted Chi Square Value	10.24	95% Jackknife UCL	1085
		95% Standard Bootstrap UCL	1027
Anderson-Darling Test Statistic	0.501	95% Bootstrap-t UCL	1722
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	2951
Kolmogorov-Smirnov Test Statistic	0.179	95% Percentile Bootstrap UCL	1064
Kolmogorov-Smirnov 5% Critical Value	0.252	95% BCA Bootstrap UCL	1233
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1677
		97.5% Chebyshev(Mean, Sd) UCL	2112
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2967
95% Approximate Gamma UCL	1223		
95% Adjusted Gamma UCL	1347		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1223

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.44	Minimum of Log Data	-0.821
Maximum	10	Maximum of Log Data	2.303
Mean	5.037	Mean of log Data	1.465
Median	5	SD of log Data	0.747
SD	2.04		
Coefficient of Variation	0.405		
Skewness	0.323		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.598	Shapiro Wilk Test Statistic	0.477
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6.094	95% H-UCL	10.01
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.03
95% Adjusted-CLT UCL (Chen-1995)	6.064	97.5% Chebyshev (MVUE) UCL	13.39
95% Modified-t UCL (Johnson-1978)	6.103	99% Chebyshev (MVUE) UCL	18.04
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.64	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.908		
MLE of Mean	5.037	Nonparametric Statistics	
MLE of Standard Deviation	3.1	95% CLT UCL	6.005
nu star	63.35	95% Jackknife UCL	6.094
Approximate Chi Square Value (.05)	46.04	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	43.8	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.955	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.738	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.483	95% Chebyshev(Mean, Sd) UCL	7.604
Kolmogorov-Smirnov 5% Critical Value	0.247	97.5% Chebyshev(Mean, Sd) UCL	8.714
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	10.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL	6.93		
95% Adjusted Gamma UCL	7.285		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	7.604

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	22.2	Maximum of Log Data	3.1
Mean	10.31	Mean of log Data	2.029
Median	10	SD of log Data	1.257
SD	4.734		
Coefficient of Variation	0.459		
Skewness	0.653		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.635	Shapiro Wilk Test Statistic	0.444
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.76
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	12.83
95% Modified-t UCL (Johnson-1978)	12.8

Assuming Lognormal Distribution

95% H-UCL	60.98
95% Chebyshev (MVUE) UCL	41.22
97.5% Chebyshev (MVUE) UCL	52.5
99% Chebyshev (MVUE) UCL	74.65

Gamma Distribution Test

k star (bias corrected)	1.403
Theta Star	7.344
MLE of Mean	10.31
MLE of Standard Deviation	8.7
nu star	33.68
Approximate Chi Square Value (.05)	21.41
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	19.93

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	12.55
95% Jackknife UCL	12.76
95% Standard Bootstrap UCL	12.44
95% Bootstrap-t UCL	12.72
95% Hall's Bootstrap UCL	14.63
95% Percentile Bootstrap UCL	12.34
95% BCA Bootstrap UCL	12.48
95% Chebyshev(Mean, Sd) UCL	16.26
97.5% Chebyshev(Mean, Sd) UCL	18.84
99% Chebyshev(Mean, Sd) UCL	23.9

Anderson-Darling Test Statistic	2.968
Anderson-Darling 5% Critical Value	0.743
Kolmogorov-Smirnov Test Statistic	0.5
Kolmogorov-Smirnov 5% Critical Value	0.249
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	16.21
95% Adjusted Gamma UCL	17.42

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 16.26

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0262	Minimum of Log Data	-3.642
Maximum	0.0631	Maximum of Log Data	-2.762
Mean	0.0447	Mean of log Data	-3.124
Median	0.0447	SD of log Data	0.191
SD	0.00788		
Coefficient of Variation	0.176		
Skewness	3.2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.578
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0488
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.0484
95% Modified-t UCL (Johnson-1978)	0.0488

Assuming Lognormal Distribution

95% H-UCL	0.05
95% Chebyshev (MVUE) UCL	0.056
97.5% Chebyshev (MVUE) UCL	0.06
99% Chebyshev (MVUE) UCL	0.069

Gamma Distribution Test

k star (bias corrected)	24.18
Theta Star	0.00185
MLE of Mean	0.0447
MLE of Standard Deviation	0.00908
nu star	580.3
Approximate Chi Square Value (.05)	525.5
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	517.5

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	2.743
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.44
Kolmogorov-Smirnov 5% Critical Value	0.245
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	0.048
95% Jackknife UCL	0.049
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.055
97.5% Chebyshev(Mean, Sd) UCL	0.059
99% Chebyshev(Mean, Sd) UCL	0.067

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0493
95% Adjusted Gamma UCL	0.0501

Potential UCL to Use

Use 95% Student's-t UCL	0.049
or 95% Modified-t UCL	0.049

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	48.47	Log-transformed Statistics	
Maximum	762.9	Minimum of Log Data	3.881
Mean	184.2	Maximum of Log Data	6.637
Median	105.7	Mean of log Data	4.865
SD	200.8	SD of log Data	0.802
Coefficient of Variation	1.09		
Skewness	2.529		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.663	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	288.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	332.9
95% Adjusted-CLT UCL (Chen-1995)	324.7	95% Chebyshev (MVUE) UCL	356.4
95% Modified-t UCL (Johnson-1978)	295.3	97.5% Chebyshev (MVUE) UCL	435.7
		99% Chebyshev (MVUE) UCL	591.7

Gamma Distribution Test

k star (bias corrected)	1.233	Data Distribution	
Theta Star	149.4	Data appear Lognormal at 5% Significance Level	
MLE of Mean	184.2		
MLE of Standard Deviation	165.9		
nu star	29.58		
Approximate Chi Square Value (.05)	18.17	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	279.5
Adjusted Chi Square Value	16.81	95% Jackknife UCL	288.3
		95% Standard Bootstrap UCL	276.5

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.745	95% Bootstrap-t UCL	433.7
Kolmogorov-Smirnov Test Statistic	0.291	95% Hall's Bootstrap UCL	608.6
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Percentile Bootstrap UCL	281.1
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	326.3
		95% Chebyshev(Mean, Sd) UCL	436.8
		97.5% Chebyshev(Mean, Sd) UCL	546.1
		99% Chebyshev(Mean, Sd) UCL	760.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	300
95% Adjusted Gamma UCL	324.1

Potential UCL to Use

Use 95% H-UCL 332.9

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	5.26	Minimum of Log Data	1.66
Maximum	12.8	Maximum of Log Data	2.549
Mean	9.03	Mean of log Data	2.185
Median	9.03	SD of log Data	0.193
SD	1.608		
Coefficient of Variation	0.178		
Skewness	-2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.577
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9.863	95% H-UCL	10.08
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.25
95% Adjusted-CLT UCL (Chen-1995)	9.793	97.5% Chebyshev (MVUE) UCL	12.2
95% Modified-t UCL (Johnson-1978)	9.863	99% Chebyshev (MVUE) UCL	14.08
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	23.68	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.381		
MLE of Mean	9.03	Nonparametric Statistics	
MLE of Standard Deviation	1.856	95% CLT UCL	9.793
nu star	568.2	95% Jackknife UCL	9.863
Approximate Chi Square Value (.05)	513.9	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	506	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.743	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.44	95% Chebyshev(Mean, Sd) UCL	11.05
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	11.93
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	13.65
Assuming Gamma Distribution			
95% Approximate Gamma UCL	9.984		
95% Adjusted Gamma UCL	10.14		
Potential UCL to Use		Use 95% Student's-t UCL	9.863
		or 95% Modified-t UCL	9.863

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.366	Minimum of Log Data	-1.005
Maximum	0.96	Maximum of Log Data	-0.041
Mean	0.663	Mean of log Data	-0.43
Median	0.663	SD of log Data	0.21
SD	0.127		
Coefficient of Variation	0.191		
Skewness	-5E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.574
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.729
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.723
95% Modified-t UCL (Johnson-1978)	0.729

Assuming Lognormal Distribution

95% H-UCL	0.748
95% Chebyshev (MVUE) UCL	0.84
97.5% Chebyshev (MVUE) UCL	0.917
99% Chebyshev (MVUE) UCL	1.067

Gamma Distribution Test

k star (bias corrected)	20.27
Theta Star	0.0327
MLE of Mean	0.663
MLE of Standard Deviation	0.147
nu star	486.5
Approximate Chi Square Value (.05)	436.3
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	429.1

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.723
95% Jackknife UCL	0.729
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.822
97.5% Chebyshev(Mean, Sd) UCL	0.891
99% Chebyshev(Mean, Sd) UCL	1.027

Anderson-Darling Test Statistic	2.748
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.442
Kolmogorov-Smirnov 5% Critical Value	0.245
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.739
95% Adjusted Gamma UCL	0.752

Potential UCL to Use

Use 95% Student's-t UCL	0.729
or 95% Modified-t UCL	0.729

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	7.8	Minimum of Log Data	2.054
Maximum	21.3	Maximum of Log Data	3.059
Mean	14.55	Mean of log Data	2.657
Median	14.55	SD of log Data	0.219
SD	2.878		
Coefficient of Variation	0.198		
Skewness	-3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.572
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	16.04	95% H-UCL	16.52
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18.62
95% Adjusted-CLT UCL (Chen-1995)	15.92	97.5% Chebyshev (MVUE) UCL	20.37
95% Modified-t UCL (Johnson-1978)	16.04	99% Chebyshev (MVUE) UCL	23.8
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	18.75	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.776		
MLE of Mean	14.55	Nonparametric Statistics	
MLE of Standard Deviation	3.36	95% CLT UCL	15.92
nu star	449.9	95% Jackknife UCL	16.04
Approximate Chi Square Value (.05)	401.8	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	394.8	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.751	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.443	95% Chebyshev(Mean, Sd) UCL	18.17
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	19.74
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	22.82
Assuming Gamma Distribution			
95% Approximate Gamma UCL	16.29		
95% Adjusted Gamma UCL	16.58		
Potential UCL to Use		Use 95% Student's-t UCL	16.04
		or 95% Modified-t UCL	16.04

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 14-08.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Antimony

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	0.33	Log-transformed Statistics	
Maximum	0.61	Minimum of Log Data	-1.109
Mean	0.47	Maximum of Log Data	-0.494
Median	0.47	Mean of log Data	-0.763
SD	0.0597	SD of log Data	0.132
Coefficient of Variation	0.127		
Skewness	5.115E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.588
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.501	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.505
95% Adjusted-CLT UCL (Chen-1995)	0.498	95% Chebyshev (MVUE) UCL	0.548
95% Modified-t UCL (Johnson-1978)	0.501	97.5% Chebyshev (MVUE) UCL	0.582
		99% Chebyshev (MVUE) UCL	0.649

Gamma Distribution Test

k star (bias corrected)	48.61	Data Distribution	
Theta Star	0.00967	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.47		
MLE of Standard Deviation	0.0674	Nonparametric Statistics	
nu star	1167	95% CLT UCL	0.498
Approximate Chi Square Value (.05)	1088	95% Jackknife UCL	0.501
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	N/A
Adjusted Chi Square Value	1077	95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.545
		97.5% Chebyshev(Mean, Sd) UCL	0.578
		99% Chebyshev(Mean, Sd) UCL	0.641

Anderson-Darling Test Statistic 2.728
 Anderson-Darling 5% Critical Value 0.73
 Kolmogorov-Smirnov Test Statistic 0.433
 Kolmogorov-Smirnov 5% Critical Value 0.245
 Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 0.504
 95% Adjusted Gamma UCL 0.509

Potential UCL to Use

Use 95% Student's-t UCL 0.501
 or 95% Modified-t UCL 0.501

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	6	Minimum of Log Data	1.792
Maximum	16.62	Maximum of Log Data	2.811
Mean	10.66	Mean of log Data	2.33
Median	10.68	SD of log Data	0.282
SD	2.948		
Coefficient of Variation	0.277		
Skewness	0.479		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.961	Shapiro Wilk Test Statistic	0.969
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	12.18	95% H-UCL	12.59
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.48
95% Adjusted-CLT UCL (Chen-1995)	12.18	97.5% Chebyshev (MVUE) UCL	16.13
95% Modified-t UCL (Johnson-1978)	12.2	99% Chebyshev (MVUE) UCL	19.37
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	10.69	Data appear Normal at 5% Significance Level	
Theta Star	0.997		
MLE of Mean	10.66		
MLE of Standard Deviation	3.259		
nu star	256.6		
Approximate Chi Square Value (.05)	220.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12.05
Adjusted Chi Square Value	215.4	95% Jackknife UCL	12.18
		95% Standard Bootstrap UCL	12.05
Anderson-Darling Test Statistic	0.264	95% Bootstrap-t UCL	12.38
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	12.6
Kolmogorov-Smirnov Test Statistic	0.167	95% Percentile Bootstrap UCL	11.99
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	12.13
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.36
		97.5% Chebyshev(Mean, Sd) UCL	15.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.12
95% Approximate Gamma UCL	12.4		
95% Adjusted Gamma UCL	12.69		
Potential UCL to Use		Use 95% Student's-t UCL	12.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	12.9	Minimum of Log Data	2.557
Maximum	85	Maximum of Log Data	4.443
Mean	50.75	Mean of log Data	3.82
Median	44.25	SD of log Data	0.516
SD	22.78		
Coefficient of Variation	0.449		
Skewness	0.524		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.86	Shapiro Wilk Critical Value	0.855
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	62.56	95% H-UCL	72.93
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	85.74
95% Adjusted-CLT UCL (Chen-1995)	62.63	97.5% Chebyshev (MVUE) UCL	100.6
95% Modified-t UCL (Johnson-1978)	62.72	99% Chebyshev (MVUE) UCL	129.7
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.695	Data appear Normal at 5% Significance Level	
Theta Star	13.73		
MLE of Mean	50.75		
MLE of Standard Deviation	26.4		
nu star	88.69		
Approximate Chi Square Value (.05)	67.98	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	61.56
Adjusted Chi Square Value	65.21	95% Jackknife UCL	62.56
		95% Standard Bootstrap UCL	61.09
Anderson-Darling Test Statistic	0.656	95% Bootstrap-t UCL	63.38
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	62.7
Kolmogorov-Smirnov Test Statistic	0.188	95% Percentile Bootstrap UCL	61.1
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	61.69
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	79.41
		97.5% Chebyshev(Mean, Sd) UCL	91.81
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	116.2
95% Approximate Gamma UCL	66.21		
95% Adjusted Gamma UCL	69.02		
Potential UCL to Use		Use 95% Student's-t UCL	62.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
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Raw Statistics

Minimum	11.7	Log-transformed Statistics	
Maximum	276.8	Minimum of Log Data	2.46
Mean	72.55	Maximum of Log Data	5.623
Median	39.48	Mean of log Data	3.947
SD	72.55	SD of log Data	0.831
Coefficient of Variation	1		
Skewness	2.332		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.718	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	110.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	140.9
95% Adjusted-CLT UCL (Chen-1995)	122.1	95% Chebyshev (MVUE) UCL	148.2
95% Modified-t UCL (Johnson-1978)	112.5	97.5% Chebyshev (MVUE) UCL	181.9
		99% Chebyshev (MVUE) UCL	247.9

Gamma Distribution Test

k star (bias corrected)	1.278	Data Distribution	
Theta Star	56.79	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	72.55		
MLE of Standard Deviation	64.18		
nu star	30.66		
Approximate Chi Square Value (.05)	19.01	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	107
Adjusted Chi Square Value	17.63	95% Jackknife UCL	110.2
		95% Standard Bootstrap UCL	104.9

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.56	95% Bootstrap-t UCL	152.1
Kolmogorov-Smirnov Test Statistic	0.744	95% Hall's Bootstrap UCL	248.1
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	107.5
Data appear Gamma Distributed at 5% Significance Level	0.249	95% BCA Bootstrap UCL	124.1
		95% Chebyshev(Mean, Sd) UCL	163.8
		97.5% Chebyshev(Mean, Sd) UCL	203.3
		99% Chebyshev(Mean, Sd) UCL	280.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	117		
95% Adjusted Gamma UCL	126.2		

Potential UCL to Use

Use 95% Approximate Gamma UCL	117
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.0266	Minimum of Log Data	-3.627
Maximum	10	Maximum of Log Data	2.303
Mean	8.766	Mean of log Data	1.764
Median	10	SD of log Data	1.7
SD	2.85		
Coefficient of Variation	0.325		
Skewness	-3.077		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.503	Shapiro Wilk Test Statistic	0.36
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.24	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	225.9
95% Adjusted-CLT UCL (Chen-1995)	9.338	95% Chebyshev (MVUE) UCL	65.67
95% Modified-t UCL (Johnson-1978)	10.12	97.5% Chebyshev (MVUE) UCL	85.59
		99% Chebyshev (MVUE) UCL	124.7

Gamma Distribution Test

k star (bias corrected)	1.085	Data Distribution	
Theta Star	8.079	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.766		
MLE of Standard Deviation	8.415		
nu star	26.04		
Approximate Chi Square Value (.05)	15.41	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.12
Adjusted Chi Square Value	14.17	95% Jackknife UCL	10.24

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.733	95% Standard Bootstrap UCL	10.05
Anderson-Darling 5% Critical Value	0.748	95% Bootstrap-t UCL	9.775
Kolmogorov-Smirnov Test Statistic	0.484	95% Hall's Bootstrap UCL	9.617
Kolmogorov-Smirnov 5% Critical Value	0.25	95% Percentile Bootstrap UCL	9.772
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.608
		95% Chebyshev(Mean, Sd) UCL	12.35
		97.5% Chebyshev(Mean, Sd) UCL	13.9
		99% Chebyshev(Mean, Sd) UCL	16.95
Assuming Gamma Distribution			
95% Approximate Gamma UCL	14.81		
95% Adjusted Gamma UCL	16.1		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	16.95
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.006	Minimum of Log Data	-5.116
Maximum	0.88	Maximum of Log Data	-0.128
Mean	0.443	Mean of log Data	-1.115
Median	0.443	SD of log Data	1.275
SD	0.186		
Coefficient of Variation	0.421		
Skewness	2.106E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.417
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.54	95% H-UCL	2.772
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.826
95% Adjusted-CLT UCL (Chen-1995)	0.531	97.5% Chebyshev (MVUE) UCL	2.328
95% Modified-t UCL (Johnson-1978)	0.54	99% Chebyshev (MVUE) UCL	3.315
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.412	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.314		
MLE of Mean	0.443		
MLE of Standard Deviation	0.373		
nu star	33.88		
Approximate Chi Square Value (.05)	21.57	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.531
Adjusted Chi Square Value	20.08	95% Jackknife UCL	0.54
Anderson-Darling Test Statistic	3.261	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.743	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.515	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	0.677
95% Approximate Gamma UCL	0.696	97.5% Chebyshev(Mean, Sd) UCL	0.779
95% Adjusted Gamma UCL	0.747	99% Chebyshev(Mean, Sd) UCL	0.978
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.677

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	112.5	Minimum of Log Data	4.723
Maximum	1300	Maximum of Log Data	7.17
Mean	502.6	Mean of log Data	6.033
Median	429.5	SD of log Data	0.656
SD	327.6		
Coefficient of Variation	0.652		
Skewness	1.427		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Critical Value	0.988
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	672.5	95% H-UCL	822
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	939.3
95% Adjusted-CLT UCL (Chen-1995)	699.8	97.5% Chebyshev (MVUE) UCL	1127
95% Modified-t UCL (Johnson-1978)	679	99% Chebyshev (MVUE) UCL	1495
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.177	Data appear Normal at 5% Significance Level	
Theta Star	230.9		
MLE of Mean	502.6		
MLE of Standard Deviation	340.7		
nu star	52.24		
Approximate Chi Square Value (.05)	36.64	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	
Adjusted Chi Square Value	34.65	95% Jackknife UCL	
Anderson-Darling Test Statistic	0.169	95% Standard Bootstrap UCL	
Anderson-Darling 5% Critical Value	0.739	95% Bootstrap-t UCL	
Kolmogorov-Smirnov Test Statistic	0.134	95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Percentile Bootstrap UCL	
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	
95% Approximate Gamma UCL	716.7	97.5% Chebyshev(Mean, Sd) UCL	
95% Adjusted Gamma UCL	757.7	99% Chebyshev(Mean, Sd) UCL	
Potential UCL to Use		Use 95% Student's-t UCL	672.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	5	Maximum of Log Data	1.609
Mean	4.205	Mean of log Data	1.07
Median	5	SD of log Data	1.284
SD	1.857		
Coefficient of Variation	0.442		
Skewness	-2.059		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.47	Shapiro Wilk Test Statistic	0.487
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.168
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	4.746
95% Modified-t UCL (Johnson-1978)	5.115

Assuming Lognormal Distribution

95% H-UCL	25.36
95% Chebyshev (MVUE) UCL	16.47
97.5% Chebyshev (MVUE) UCL	21.02
99% Chebyshev (MVUE) UCL	29.94

Gamma Distribution Test

k star (bias corrected)	1.188
Theta Star	3.541
MLE of Mean	4.205
MLE of Standard Deviation	3.859
nu star	28.5
Approximate Chi Square Value (.05)	17.32
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	16

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	5.087
95% Jackknife UCL	5.168
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	6.542
97.5% Chebyshev(Mean, Sd) UCL	7.554
99% Chebyshev(Mean, Sd) UCL	9.54

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.521
Kolmogorov-Smirnov 5% Critical Value	0.25

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.92
95% Adjusted Gamma UCL	7.49

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	6.542
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.036	Log-transformed Statistics	
Maximum	11.8	Minimum of Log Data	-3.324
Mean	8.461	Maximum of Log Data	2.468
Median	10	Mean of log Data	1.421
SD	3.966	SD of log Data	2.093
Coefficient of Variation	0.469		
Skewness	-1.963		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.559	Shapiro Wilk Test Statistic	0.492
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.52	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	964.5
95% Adjusted-CLT UCL (Chen-1995)	9.65	95% Chebyshev (MVUE) UCL	93.69
95% Modified-t UCL (Johnson-1978)	10.41	97.5% Chebyshev (MVUE) UCL	123.7
		99% Chebyshev (MVUE) UCL	182.5

Gamma Distribution Test

k star (bias corrected)	0.676	Data Distribution	
Theta Star	12.52	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.461		
MLE of Standard Deviation	10.29		
nu star	16.22		
Approximate Chi Square Value (.05)	8.115	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.34
Adjusted Chi Square Value	7.256	95% Jackknife UCL	10.52

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.481	95% Standard Bootstrap UCL	10.31
Anderson-Darling 5% Critical Value	0.763	95% Bootstrap-t UCL	9.932
Kolmogorov-Smirnov Test Statistic	0.521	95% Hall's Bootstrap UCL	9.732
Kolmogorov-Smirnov 5% Critical Value	0.254	95% Percentile Bootstrap UCL	10.15
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.969
		95% Chebyshev(Mean, Sd) UCL	13.45
		97.5% Chebyshev(Mean, Sd) UCL	15.61
		99% Chebyshev(Mean, Sd) UCL	19.85

Assuming Gamma Distribution

95% Approximate Gamma UCL	16.91		
95% Adjusted Gamma UCL	18.91		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	19.85
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0077	Minimum of Log Data	-4.867
Maximum	0.0628	Maximum of Log Data	-2.768
Mean	0.0352	Mean of log Data	-3.424
Median	0.0352	SD of log Data	0.484
SD	0.0117		
Coefficient of Variation	0.333		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.513
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0413
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.0408
95% Modified-t UCL (Johnson-1978)	0.0413

Assuming Lognormal Distribution

95% H-UCL	0.0499
95% Chebyshev (MVUE) UCL	0.0587
97.5% Chebyshev (MVUE) UCL	0.0685
99% Chebyshev (MVUE) UCL	0.0876

Gamma Distribution Test

k star (bias corrected)	4.948
Theta Star	0.00712
MLE of Mean	0.0352
MLE of Standard Deviation	0.0158
nu star	118.8
Approximate Chi Square Value (.05)	94.59
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	91.3

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.0408
95% Jackknife UCL	0.0413
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.05
97.5% Chebyshev(Mean, Sd) UCL	0.0564
99% Chebyshev(Mean, Sd) UCL	0.0689

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	2.862
Kolmogorov-Smirnov Test Statistic	0.469
Kolmogorov-Smirnov 5% Critical Value	0.246
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0442
95% Adjusted Gamma UCL	0.0458

Potential UCL to Use

Use 95% Student's-t UCL	0.0413
or 95% Modified-t UCL	0.0413

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	8.8	Log-transformed Statistics	
Maximum	638.1	Minimum of Log Data	2.175
Mean	195.1	Maximum of Log Data	6.459
Median	64.74	Mean of log Data	4.473
SD	224.6	SD of log Data	1.423
Coefficient of Variation	1.151		
Skewness	1.027		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.79	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	311.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1197
95% Adjusted-CLT UCL (Chen-1995)	322.3	95% Chebyshev (MVUE) UCL	619.1
95% Modified-t UCL (Johnson-1978)	314.7	97.5% Chebyshev (MVUE) UCL	796.4
		99% Chebyshev (MVUE) UCL	1145

Gamma Distribution Test

k star (bias corrected)	0.617	Data Distribution	
Theta Star	316.3	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	195.1		
MLE of Standard Deviation	248.4		
nu star	14.8		
Approximate Chi Square Value (.05)	7.126	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	301.7
Adjusted Chi Square Value	6.329	95% Jackknife UCL	311.5
		95% Standard Bootstrap UCL	297.2
		95% Bootstrap-t UCL	350.7
		95% Hall's Bootstrap UCL	287.1
		95% Percentile Bootstrap UCL	304.4
		95% BCA Bootstrap UCL	314.5
		95% Chebyshev(Mean, Sd) UCL	477.7
		97.5% Chebyshev(Mean, Sd) UCL	599.9
		99% Chebyshev(Mean, Sd) UCL	840.1

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.613		
Anderson-Darling 5% Critical Value	0.766		
Kolmogorov-Smirnov Test Statistic	0.227		
Kolmogorov-Smirnov 5% Critical Value	0.255		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	405.3		
95% Adjusted Gamma UCL	456.3		

Potential UCL to Use

Use 95% Approximate Gamma UCL	405.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.04	Minimum of Log Data	-3.219
Maximum	0.238	Maximum of Log Data	-1.435
Mean	0.139	Mean of log Data	-2.032
Median	0.139	SD of log Data	0.404
SD	0.0422		
Coefficient of Variation	0.304		
Skewness	1.101E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.53
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.161	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.182
95% Adjusted-CLT UCL (Chen-1995)	0.159	95% Chebyshev (MVUE) UCL	0.214
95% Modified-t UCL (Johnson-1978)	0.161	97.5% Chebyshev (MVUE) UCL	0.246
		99% Chebyshev (MVUE) UCL	0.308

Gamma Distribution Test

k star (bias corrected)	6.536	Data Distribution	
Theta Star	0.0213	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.139		
MLE of Standard Deviation	0.0544	Nonparametric Statistics	
nu star	156.9	95% CLT UCL	0.159
Approximate Chi Square Value (.05)	128.9	95% Jackknife UCL	0.161
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	N/A
Adjusted Chi Square Value	125	95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.192
		97.5% Chebyshev(Mean, Sd) UCL	0.215
		99% Chebyshev(Mean, Sd) UCL	0.26

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.462		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.169		
95% Adjusted Gamma UCL	0.174		

Potential UCL to Use

Use 95% Student's-t UCL	0.161
or 95% Modified-t UCL	0.161

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.91	Minimum of Log Data	-0.0943
Maximum	5.92	Maximum of Log Data	1.778
Mean	3.415	Mean of log Data	1.164
Median	3.415	SD of log Data	0.427
SD	1.068		
Coefficient of Variation	0.313		
Skewness	1.431E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.525
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.969	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4.568
95% Adjusted-CLT UCL (Chen-1995)	3.922	95% Chebyshev (MVUE) UCL	5.379
95% Modified-t UCL (Johnson-1978)	3.969	97.5% Chebyshev (MVUE) UCL	6.202
		99% Chebyshev (MVUE) UCL	7.817

Gamma Distribution Test

k star (bias corrected)	6.004	Data Distribution	
Theta Star	0.569	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.415		
MLE of Standard Deviation	1.394		
nu star	144.1		
Approximate Chi Square Value (.05)	117.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	3.922
Adjusted Chi Square Value	113.7	95% Jackknife UCL	3.969

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.731	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.464	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.193	95% Chebyshev(Mean, Sd) UCL	4.759
95% Adjusted Gamma UCL	4.329	97.5% Chebyshev(Mean, Sd) UCL	5.341
		99% Chebyshev(Mean, Sd) UCL	6.483

Potential UCL to Use

Use 95% Student's-t UCL	3.969
or 95% Modified-t UCL	3.969

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
From File 14-09.wst
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Antimony

General Statistics
Number of Valid Observations 12 Number of Distinct Observations 1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	5.85	Minimum of Log Data	1.766
Maximum	23.57	Maximum of Log Data	3.16
Mean	11.32	Mean of log Data	2.363
Median	11	SD of log Data	0.36
SD	4.63		
Coefficient of Variation	0.409		
Skewness	1.791		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Test Statistic	0.829	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	13.72	95% H-UCL	14.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	16.44
95% Adjusted-CLT UCL (Chen-1995)	14.25	97.5% Chebyshev (MVUE) UCL	18.68
95% Modified-t UCL (Johnson-1978)	13.83	99% Chebyshev (MVUE) UCL	23.08
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.069	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.865		
MLE of Mean	11.32		
MLE of Standard Deviation	4.593		
nu star	145.6		
Approximate Chi Square Value (.05)	118.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	13.51
Adjusted Chi Square Value	115.1	95% Jackknife UCL	13.72
		95% Standard Bootstrap UCL	13.42
Anderson-Darling Test Statistic	0.474	95% Bootstrap-t UCL	15.42
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	23.91
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL	13.52
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	14.13
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17.14
		97.5% Chebyshev(Mean, Sd) UCL	19.66
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	24.62
95% Approximate Gamma UCL	13.88		
95% Adjusted Gamma UCL	14.32		
Potential UCL to Use		Use 95% Approximate Gamma UCL	13.88

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cadmium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Cesium-137

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.19	Minimum of Log Data	-1.661
Maximum	0.62	Maximum of Log Data	-0.478
Mean	0.405	Mean of log Data	-0.931
Median	0.405	SD of log Data	0.26
SD	0.0917		
Coefficient of Variation	0.226		
Skewness	-3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.563
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.453	95% H-UCL	0.473
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.54
95% Adjusted-CLT UCL (Chen-1995)	0.449	97.5% Chebyshev (MVUE) UCL	0.598
95% Modified-t UCL (Johnson-1978)	0.453	99% Chebyshev (MVUE) UCL	0.712

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	13.77	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0294		
MLE of Mean	0.405		
MLE of Standard Deviation	0.109		
nu star	330.6		
Approximate Chi Square Value (.05)	289.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.449
Adjusted Chi Square Value	283.6	95% Jackknife UCL	0.453

Anderson-Darling Test Statistic		95% Standard Bootstrap UCL	
Anderson-Darling 5% Critical Value	2.765	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.448	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	0.245	95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.52
		97.5% Chebyshev(Mean, Sd) UCL	0.57
		99% Chebyshev(Mean, Sd) UCL	0.668
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.463		
95% Adjusted Gamma UCL	0.472		

Potential UCL to Use		Use 95% Student's-t UCL	0.453
		or 95% Modified-t UCL	0.453

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	32.35	Minimum of Log Data	3.477
Maximum	85	Maximum of Log Data	4.443
Mean	52.63	Mean of log Data	3.874
Median	38.17	SD of log Data	0.431
SD	24.2		
Coefficient of Variation	0.46		
Skewness	0.732		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.746
Shapiro Wilk Test Statistic	0.705	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	65.17	95% H-UCL	69.03
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	81.3
95% Adjusted-CLT UCL (Chen-1995)	65.7	97.5% Chebyshev (MVUE) UCL	93.82
95% Modified-t UCL (Johnson-1978)	65.42	99% Chebyshev (MVUE) UCL	118.4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.359	Data do not follow a Discernable Distribution (0.05)	
Theta Star	12.08		
MLE of Mean	52.63	Nonparametric Statistics	
MLE of Standard Deviation	25.21	95% CLT UCL	64.12
nu star	104.6	95% Jackknife UCL	65.17
Approximate Chi Square Value (.05)	82	95% Standard Bootstrap UCL	63.65
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	70.12
Adjusted Chi Square Value	78.95	95% Hall's Bootstrap UCL	61.04
Anderson-Darling Test Statistic	1.529	95% Percentile Bootstrap UCL	64.53
Anderson-Darling 5% Critical Value	0.732	95% BCA Bootstrap UCL	65.4
Kolmogorov-Smirnov Test Statistic	0.298	95% Chebyshev(Mean, Sd) UCL	83.08
Kolmogorov-Smirnov 5% Critical Value	0.246	97.5% Chebyshev(Mean, Sd) UCL	96.25
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	122.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	67.13		
95% Adjusted Gamma UCL	69.73		
Potential UCL to Use		Use 95% Student's-t UCL	65.17
		or 95% Modified-t UCL	65.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	1.13	Minimum of Log Data	0.122
Maximum	10	Maximum of Log Data	2.303
Mean	9.261	Mean of log Data	2.121
Median	10	SD of log Data	0.629
SD	2.561		
Coefficient of Variation	0.276		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.59	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.76
95% Adjusted-CLT UCL (Chen-1995)	9.687	95% Chebyshev (MVUE) UCL	18.15
95% Modified-t UCL (Johnson-1978)	10.47	97.5% Chebyshev (MVUE) UCL	21.69
		99% Chebyshev (MVUE) UCL	28.64

Gamma Distribution Test

k star (bias corrected)	3.751	Data Distribution	
Theta Star	2.469	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.261		
MLE of Standard Deviation	4.782		
nu star	90.01		

Approximate Chi Square Value (.05)	69.14	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.48
Adjusted Chi Square Value	66.35	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	12.48
		97.5% Chebyshev(Mean, Sd) UCL	13.88
		99% Chebyshev(Mean, Sd) UCL	16.62

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.142		
Anderson-Darling 5% Critical Value	0.732		
Kolmogorov-Smirnov Test Statistic	0.543		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.06		
95% Adjusted Gamma UCL	12.56		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	12.48
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	2.99	Minimum of Log Data	1.095
Maximum	16	Maximum of Log Data	2.773
Mean	9.495	Mean of log Data	2.198
Median	9.495	SD of log Data	0.378
SD	2.774		
Coefficient of Variation	0.292		
Skewness	-3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.536
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.93	95% H-UCL	12.16
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.26
95% Adjusted-CLT UCL (Chen-1995)	10.81	97.5% Chebyshev (MVUE) UCL	16.26
95% Modified-t UCL (Johnson-1978)	10.93	99% Chebyshev (MVUE) UCL	20.21
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	7.28	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.304		
MLE of Mean	9.495		
MLE of Standard Deviation	3.519		
nu star	174.7		
Approximate Chi Square Value (.05)	145.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.81
Adjusted Chi Square Value	141	95% Jackknife UCL	10.93
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.813	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.46	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.99
		97.5% Chebyshev(Mean, Sd) UCL	14.5
		99% Chebyshev(Mean, Sd) UCL	17.46
Assuming Gamma Distribution			
95% Approximate Gamma UCL	11.43		
95% Adjusted Gamma UCL	11.76		
Potential UCL to Use		Use 95% Student's-t UCL	10.93
		or 95% Modified-t UCL	10.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	147.3	Minimum of Log Data	4.993
Maximum	1725	Maximum of Log Data	7.453
Mean	538.1	Mean of log Data	5.992
Median	327.7	SD of log Data	0.757
SD	495.5		
Coefficient of Variation	0.921		
Skewness	1.792		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Test Statistic	0.733	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	795	95% H-UCL	943.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1034
95% Adjusted-CLT UCL (Chen-1995)	852.5	97.5% Chebyshev (MVUE) UCL	1258
95% Modified-t UCL (Johnson-1978)	807.3	99% Chebyshev (MVUE) UCL	1697
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.434	Data appear Lognormal at 5% Significance Level	
Theta Star	375.2		
MLE of Mean	538.1	Nonparametric Statistics	
MLE of Standard Deviation	449.3	95% CLT UCL	773.4
nu star	34.42	95% Jackknife UCL	795
Approximate Chi Square Value (.05)	22	95% Standard Bootstrap UCL	769.2
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	1199
Adjusted Chi Square Value	20.5	95% Hall's Bootstrap UCL	1934
Anderson-Darling Test Statistic	0.784	95% Percentile Bootstrap UCL	770.5
Anderson-Darling 5% Critical Value	0.743	95% BCA Bootstrap UCL	871.2
Kolmogorov-Smirnov Test Statistic	0.295	95% Chebyshev(Mean, Sd) UCL	1162
Kolmogorov-Smirnov 5% Critical Value	0.249	97.5% Chebyshev(Mean, Sd) UCL	1431
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	1961
Assuming Gamma Distribution			
95% Approximate Gamma UCL	841.9		
95% Adjusted Gamma UCL	903.7		
Potential UCL to Use		Use 95% H-UCL	943.4

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	5	Minimum of Log Data	1.609
Maximum	10	Maximum of Log Data	2.303
Mean	5.833	Mean of log Data	1.725
Median	5	SD of log Data	0.27
SD	1.946		
Coefficient of Variation	0.334		
Skewness	2.055		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.465	Shapiro Wilk Test Statistic	0.465
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.842	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.793
95% Adjusted-CLT UCL (Chen-1995)	7.114	95% Chebyshev (MVUE) UCL	7.787
95% Modified-t UCL (Johnson-1978)	6.898	97.5% Chebyshev (MVUE) UCL	8.645
		99% Chebyshev (MVUE) UCL	10.33

Gamma Distribution Test

k star (bias corrected)	9.887	Data Distribution	
Theta Star	0.59	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.833		
MLE of Standard Deviation	1.855		
nu star	237.3		
Approximate Chi Square Value (.05)	202.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	6.757
Adjusted Chi Square Value	197.7	95% Jackknife UCL	N/A

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.442	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.507	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	8.282
		97.5% Chebyshev(Mean, Sd) UCL	9.342
		99% Chebyshev(Mean, Sd) UCL	11.42

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.831
95% Adjusted Gamma UCL	7

Potential UCL to Use

Use 95% Student's-t UCL	6.842
or 95% Modified-t UCL	6.898

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	166	Minimum of Log Data	5.112
Maximum	215	Maximum of Log Data	5.371
Mean	190.5	Mean of log Data	5.248
Median	190.5	SD of log Data	0.055
SD	10.45		
Coefficient of Variation	0.0548		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.597
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	195.9	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	203.7
95% Adjusted-CLT UCL (Chen-1995)	195.5	97.5% Chebyshev (MVUE) UCL	209.5
95% Modified-t UCL (Johnson-1978)	195.9	99% Chebyshev (MVUE) UCL	220.7

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	270	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.706		
MLE of Mean	190.5		
MLE of Standard Deviation	11.59		
nu star	6480		

Approximate Chi Square Value (.05)		Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	195.5
Adjusted Chi Square Value	6266	95% Jackknife UCL	195.9
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.716	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.424	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	203.6
		97.5% Chebyshev(Mean, Sd) UCL	209.3
		99% Chebyshev(Mean, Sd) UCL	220.5
Assuming Gamma Distribution			
95% Approximate Gamma UCL	196.1		
95% Adjusted Gamma UCL	197		

Potential UCL to Use		Use 95% Student's-t UCL	195.9
		or 95% Modified-t UCL	195.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	21.77	Minimum of Log Data	3.081
Maximum	4600	Maximum of Log Data	8.434
Mean	665	Mean of log Data	5.562
Median	275.1	SD of log Data	1.37
SD	1266		
Coefficient of Variation	1.904		
Skewness	3.216		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.503	Shapiro Wilk Test Statistic	0.978
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1321	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2978
95% Adjusted-CLT UCL (Chen-1995)	1629	95% Chebyshev (MVUE) UCL	1687
95% Modified-t UCL (Johnson-1978)	1378	97.5% Chebyshev (MVUE) UCL	2164
		99% Chebyshev (MVUE) UCL	3101

Gamma Distribution Test

k star (bias corrected)	0.544	Data Distribution	
Theta Star	1223	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	665		
MLE of Standard Deviation	901.9		
nu star	13.05		
Approximate Chi Square Value (.05)	5.925	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1266
Adjusted Chi Square Value	5.21	95% Jackknife UCL	1321
		95% Standard Bootstrap UCL	1239

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.72	95% Bootstrap-t UCL	3554
Anderson-Darling 5% Critical Value	0.773	95% Hall's Bootstrap UCL	3359
Kolmogorov-Smirnov Test Statistic	0.252	95% Percentile Bootstrap UCL	1362
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	1711
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2258
		97.5% Chebyshev(Mean, Sd) UCL	2947
		99% Chebyshev(Mean, Sd) UCL	4302

Assuming Gamma Distribution

95% Approximate Gamma UCL	1464
95% Adjusted Gamma UCL	1665

Potential UCL to Use

Use 95% Approximate Gamma UCL 1464

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	43.2	Minimum of Log Data	3.766
Maximum	1070	Maximum of Log Data	6.975
Mean	556.6	Mean of log Data	6.163
Median	556.6	SD of log Data	0.778
SD	218.9		
Coefficient of Variation	0.393		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.464
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	670.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1165
95% Adjusted-CLT UCL (Chen-1995)	660.5	95% Chebyshev (MVUE) UCL	1264
95% Modified-t UCL (Johnson-1978)	670.1	97.5% Chebyshev (MVUE) UCL	1541
		99% Chebyshev (MVUE) UCL	2085

Gamma Distribution Test

k star (bias corrected)	2.539	Data Distribution	
Theta Star	219.2	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	556.6		
MLE of Standard Deviation	349.3		
nu star	60.93		
Approximate Chi Square Value (.05)	43.98	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	660.5
Adjusted Chi Square Value	41.79	95% Jackknife UCL	670.1

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.013	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.738	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.49	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	832.1
		97.5% Chebyshev(Mean, Sd) UCL	951.3
		99% Chebyshev(Mean, Sd) UCL	1185

Assuming Gamma Distribution

95% Approximate Gamma UCL	771.1
95% Adjusted Gamma UCL	811.5

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 832.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	3.32	Minimum of Log Data	1.2
Maximum	70	Maximum of Log Data	4.248
Mean	36.66	Mean of log Data	3.455
Median	36.66	SD of log Data	0.734
SD	14.22		
Coefficient of Variation	0.388		
Skewness	2.8E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.47
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	44.03	95% H-UCL	71.59
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	79.35
95% Adjusted-CLT UCL (Chen-1995)	43.41	97.5% Chebyshev (MVUE) UCL	96.21
95% Modified-t UCL (Johnson-1978)	44.03	99% Chebyshev (MVUE) UCL	129.3

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.738	Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.39		

MLE of Mean	36.66	Nonparametric Statistics	
MLE of Standard Deviation	22.15	95% CLT UCL	43.41
nu star	65.72	95% Jackknife UCL	44.03
Approximate Chi Square Value (.05)	48.07	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	45.77	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.99	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.487	95% Chebyshev(Mean, Sd) UCL	54.55
Kolmogorov-Smirnov 5% Critical Value	0.247	97.5% Chebyshev(Mean, Sd) UCL	62.29
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	77.49
Assuming Gamma Distribution			
95% Approximate Gamma UCL	50.12		
95% Adjusted Gamma UCL	52.64		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	54.55
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	73.5	Minimum of Log Data	4.297
Maximum	1540	Maximum of Log Data	7.34
Mean	806.8	Mean of log Data	6.547
Median	806.8	SD of log Data	0.733
SD	312.7		
Coefficient of Variation	0.388		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Critical Value	0.47
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	968.8	95% H-UCL	1571
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1743
95% Adjusted-CLT UCL (Chen-1995)	955.2	97.5% Chebyshev (MVUE) UCL	2113
95% Modified-t UCL (Johnson-1978)	968.8	99% Chebyshev (MVUE) UCL	2840
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.747	Data do not follow a Discernable Distribution (0.05)	
Theta Star	293.7		
MLE of Mean	806.8		
MLE of Standard Deviation	486.8		
nu star	65.92		
Approximate Chi Square Value (.05)	48.24	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	955.2
Adjusted Chi Square Value	45.94	95% Jackknife UCL	968.8
Anderson-Darling Test Statistic	2.989	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.487	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	1200
		97.5% Chebyshev(Mean, Sd) UCL	1370
		99% Chebyshev(Mean, Sd) UCL	1705
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1102		
95% Adjusted Gamma UCL	1158		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	1200

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options		
From File		14-10.wst
Full Precision		OFF
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.21
Maximum	1.1
Mean	0.75
Median	0.75
SD	0.202
Coefficient of Variation	0.27
Skewness	-1.419

Log-transformed Statistics

Minimum of Log Data	-1.561
Maximum of Log Data	0.095
Mean of log Data	-0.343
SD of log Data	0.402

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.673	Shapiro Wilk Test Statistic	0.541
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.855
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.82
95% Modified-t UCL (Johnson-1978)	0.851

Assuming Lognormal Distribution

95% H-UCL	0.984
95% Chebyshev (MVUE) UCL	1.157
97.5% Chebyshev (MVUE) UCL	1.327
99% Chebyshev (MVUE) UCL	1.661

Gamma Distribution Test

k star (bias corrected)	6.954
Theta Star	0.108
MLE of Mean	0.75
MLE of Standard Deviation	0.284
nu star	166.9
Approximate Chi Square Value (.05)	138
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	134

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.846
95% Jackknife UCL	0.855
95% Standard Bootstrap UCL	0.841
95% Bootstrap-t UCL	0.837
95% Hall's Bootstrap UCL	0.839
95% Percentile Bootstrap UCL	0.838
95% BCA Bootstrap UCL	0.824
95% Chebyshev(Mean, Sd) UCL	1.005
97.5% Chebyshev(Mean, Sd) UCL	1.115
99% Chebyshev(Mean, Sd) UCL	1.331

Anderson-Darling Test Statistic	2.429
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.461
Kolmogorov-Smirnov 5% Critical Value	0.245
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.907
95% Adjusted Gamma UCL	0.934

Potential UCL to Use

Use 95% Student's-t UCL	0.855
or 95% Modified-t UCL	0.851

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

Minimum	6.2	Log-transformed Statistics	
Maximum	14.57	Minimum of Log Data	1.825
Mean	10.25	Maximum of Log Data	2.679
Median	10.82	Mean of log Data	2.3
SD	2.439	SD of log Data	0.249
Coefficient of Variation	0.238		
Skewness	0.049		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.51	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.85
95% Adjusted-CLT UCL (Chen-1995)	11.42	95% Chebyshev (MVUE) UCL	13.49
95% Modified-t UCL (Johnson-1978)	11.52	97.5% Chebyshev (MVUE) UCL	14.89
		99% Chebyshev (MVUE) UCL	17.64

Gamma Distribution Test

k star (bias corrected)	13.86	Data Distribution	
Theta Star	0.74	Data appear Normal at 5% Significance Level	
MLE of Mean	10.25		
MLE of Standard Deviation	2.753		
nu star	332.6		
Approximate Chi Square Value (.05)	291.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.41
Adjusted Chi Square Value	285.4	95% Jackknife UCL	11.51

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.39	95% Standard Bootstrap UCL	11.36
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	11.49
Kolmogorov-Smirnov Test Statistic	0.178	95% Hall's Bootstrap UCL	11.45
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	11.41
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	11.38

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.7	95% Chebyshev(Mean, Sd) UCL	13.32
95% Adjusted Gamma UCL	11.94	97.5% Chebyshev(Mean, Sd) UCL	14.65
		99% Chebyshev(Mean, Sd) UCL	17.26

Potential UCL to Use

Use 95% Student's-t UCL	11.51
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	104	Minimum of Log Data	4.644
Maximum	172	Maximum of Log Data	5.147
Mean	131	Mean of log Data	4.869
Median	131	SD of log Data	0.113
SD	15.39		
Coefficient of Variation	0.117		
Skewness	1.391		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.701
Shapiro Wilk Test Statistic	0.673	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	139	95% H-UCL	139.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	149.6
95% Adjusted-CLT UCL (Chen-1995)	140.2	97.5% Chebyshev (MVUE) UCL	157.6
95% Modified-t UCL (Johnson-1978)	139.3	99% Chebyshev (MVUE) UCL	173.4

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	63.09	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.076		
MLE of Mean	131		
MLE of Standard Deviation	16.49		
nu star	1514		
Approximate Chi Square Value (.05)	1425	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	138.3
Adjusted Chi Square Value	1412	95% Jackknife UCL	139

Anderson-Darling Test Statistic	2.033	95% Standard Bootstrap UCL	138
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	140.7
Kolmogorov-Smirnov Test Statistic	0.402	95% Hall's Bootstrap UCL	183
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	137.8
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	139
		95% Chebyshev(Mean, Sd) UCL	150.4
		97.5% Chebyshev(Mean, Sd) UCL	158.7
		99% Chebyshev(Mean, Sd) UCL	175.2

Assuming Gamma Distribution	
95% Approximate Gamma UCL	139.2
95% Adjusted Gamma UCL	140.5

Potential UCL to Use	Use 95% Student's-t UCL	139
	or 95% Modified-t UCL	139.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	32.24	Minimum of Log Data	3.473
Maximum	85	Maximum of Log Data	4.443
Mean	53.99	Mean of log Data	3.911
Median	41.48	SD of log Data	0.402
SD	23.14		
Coefficient of Variation	0.429		
Skewness	0.739		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.72	Shapiro Wilk Test Statistic	0.771
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	65.98	95% H-UCL	69.24
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	81.39
95% Adjusted-CLT UCL (Chen-1995)	66.5	97.5% Chebyshev (MVUE) UCL	93.35
95% Modified-t UCL (Johnson-1978)	66.22	99% Chebyshev (MVUE) UCL	116.8
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.997	Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.8		
MLE of Mean	53.99		
MLE of Standard Deviation	24.15		
nu star	119.9		
Approximate Chi Square Value (.05)	95.64	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	64.97
Adjusted Chi Square Value	92.33	95% Jackknife UCL	65.98
		95% Standard Bootstrap UCL	64.79
Anderson-Darling Test Statistic	1.455	95% Bootstrap-t UCL	71.33
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	61.83
Kolmogorov-Smirnov Test Statistic	0.298	95% Percentile Bootstrap UCL	65.41
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	65.98
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	83.1
		97.5% Chebyshev(Mean, Sd) UCL	95.7
		99% Chebyshev(Mean, Sd) UCL	120.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	67.7		
95% Adjusted Gamma UCL	70.12		
Potential UCL to Use		Use 95% Student's-t UCL	65.98
		or 95% Modified-t UCL	66.22

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	35	Minimum of Log Data	3.555
Maximum	275.7	Maximum of Log Data	5.619
Mean	93.22	Mean of log Data	4.314
Median	68.39	SD of log Data	0.674
SD	70.94		
Coefficient of Variation	0.761		
Skewness	1.737		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.93
Shapiro Wilk Test Statistic	0.81	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	130	95% H-UCL	152.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	172.7
95% Adjusted-CLT UCL (Chen-1995)	137.9	97.5% Chebyshev (MVUE) UCL	207.7
95% Modified-t UCL (Johnson-1978)	131.7	99% Chebyshev (MVUE) UCL	276.5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.869	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	49.88		
MLE of Mean	93.22		
MLE of Standard Deviation	68.19		
nu star	44.85		
Approximate Chi Square Value (.05)	30.49	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	126.9
Adjusted Chi Square Value	28.69	95% Jackknife UCL	130
		95% Standard Bootstrap UCL	125.9
Anderson-Darling Test Statistic	0.405	95% Bootstrap-t UCL	151.9
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	272.1
Kolmogorov-Smirnov Test Statistic	0.151	95% Percentile Bootstrap UCL	126.9
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	136.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	182.5
		97.5% Chebyshev(Mean, Sd) UCL	221.1
		99% Chebyshev(Mean, Sd) UCL	297
Assuming Gamma Distribution			
95% Approximate Gamma UCL	137.1		
95% Adjusted Gamma UCL	145.7		
Potential UCL to Use		Use 95% Approximate Gamma UCL	137.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	7471	Minimum of Log Data	8.919
Maximum	39015	Maximum of Log Data	10.57
Mean	21960	Mean of log Data	9.903
Median	19928	SD of log Data	0.471
SD	9569		
Coefficient of Variation	0.436		
Skewness	0.558		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	26921	95% H-UCL	30096
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35467
95% Adjusted-CLT UCL (Chen-1995)	26979	97.5% Chebyshev (MVUE) UCL	41250
95% Modified-t UCL (Johnson-1978)	26995	99% Chebyshev (MVUE) UCL	52609
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.155	Data appear Normal at 5% Significance Level	
Theta Star	5285		
MLE of Mean	21960		
MLE of Standard Deviation	10773		
nu star	99.73		
Approximate Chi Square Value (.05)	77.69	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	26503
Adjusted Chi Square Value	74.72	95% Jackknife UCL	26921
		95% Standard Bootstrap UCL	26257
Anderson-Darling Test Statistic	0.185	95% Bootstrap-t UCL	27507
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	28091
Kolmogorov-Smirnov Test Statistic	0.123	95% Percentile Bootstrap UCL	26696
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	26520
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	34001
		97.5% Chebyshev(Mean, Sd) UCL	39211
		99% Chebyshev(Mean, Sd) UCL	49445
Assuming Gamma Distribution			
95% Approximate Gamma UCL	28189		
95% Adjusted Gamma UCL	29307		
Potential UCL to Use		Use 95% Student's-t UCL	26921

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	120.4	Log-transformed Statistics	
Maximum	1063	Minimum of Log Data	4.791
Mean	581.3	Maximum of Log Data	6.969
Median	547.4	Mean of log Data	6.256
SD	249.7	SD of log Data	0.547
Coefficient of Variation	0.43		
Skewness	0.481		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.917	Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	710.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	869.2
95% Adjusted-CLT UCL (Chen-1995)	710.6	95% Chebyshev (MVUE) UCL	1018
95% Modified-t UCL (Johnson-1978)	712.4	97.5% Chebyshev (MVUE) UCL	1201
		99% Chebyshev (MVUE) UCL	1559

Gamma Distribution Test

k star (bias corrected)	3.601	Data Distribution	
Theta Star	161.4	Data appear Normal at 5% Significance Level	
MLE of Mean	581.3		
MLE of Standard Deviation	306.3		
nu star	86.42		
Approximate Chi Square Value (.05)	65.99	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	699.9
Adjusted Chi Square Value	63.28	95% Jackknife UCL	710.7
		95% Standard Bootstrap UCL	696.1

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.621	95% Bootstrap-t UCL	726.6
Kolmogorov-Smirnov Test Statistic	0.733	95% Hall's Bootstrap UCL	827.2
Kolmogorov-Smirnov 5% Critical Value	0.182	95% Percentile Bootstrap UCL	696.7
Data appear Gamma Distributed at 5% Significance Level	0.246	95% BCA Bootstrap UCL	706
		95% Chebyshev(Mean, Sd) UCL	895.5
		97.5% Chebyshev(Mean, Sd) UCL	1031
		99% Chebyshev(Mean, Sd) UCL	1299

Assuming Gamma Distribution

95% Approximate Gamma UCL	761.2
95% Adjusted Gamma UCL	793.9

Potential UCL to Use

Use 95% Student's-t UCL	710.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.92	Minimum of Log Data	-0.083
Maximum	43.71	Maximum of Log Data	3.778
Mean	11.86	Mean of log Data	2.206
Median	10	SD of log Data	0.842
SD	10.36		
Coefficient of Variation	0.873		
Skewness	3.032		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.614
Shapiro Wilk Test Statistic	0.492	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	17.23	95% H-UCL	25.28
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	26.41
95% Adjusted-CLT UCL (Chen-1995)	19.58	97.5% Chebyshev (MVUE) UCL	32.44
95% Modified-t UCL (Johnson-1978)	17.67	99% Chebyshev (MVUE) UCL	44.28
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.573	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.541		
MLE of Mean	11.86		
MLE of Standard Deviation	9.458		
nu star	37.76		
Approximate Chi Square Value (.05)	24.69	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	16.78
Adjusted Chi Square Value	23.08	95% Jackknife UCL	17.23
		95% Standard Bootstrap UCL	16.72
Anderson-Darling Test Statistic	2.398	95% Bootstrap-t UCL	56.48
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	69.96
Kolmogorov-Smirnov Test Statistic	0.415	95% Percentile Bootstrap UCL	17.54
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	18.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	24.9
		97.5% Chebyshev(Mean, Sd) UCL	30.53
		99% Chebyshev(Mean, Sd) UCL	41.61
Assuming Gamma Distribution			
95% Approximate Gamma UCL	18.14		
95% Adjusted Gamma UCL	19.4		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	24.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.073	Minimum of Log Data	-2.617
Maximum	2.64	Maximum of Log Data	0.971
Mean	1.357	Mean of log Data	0.117
Median	1.357	SD of log Data	0.882
SD	0.547		
Coefficient of Variation	0.403		
Skewness	-1E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.451
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.64
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.616
95% Modified-t UCL (Johnson-1978)	1.64

Assuming Lognormal Distribution

95% H-UCL	3.407
95% Chebyshev (MVUE) UCL	3.461
97.5% Chebyshev (MVUE) UCL	4.27
99% Chebyshev (MVUE) UCL	5.859

Gamma Distribution Test

k star (bias corrected)	2.167
Theta Star	0.626
MLE of Mean	1.357
MLE of Standard Deviation	0.922
nu star	52
Approximate Chi Square Value (.05)	36.44
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	34.46

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.616
95% Jackknife UCL	1.64
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	2.045
97.5% Chebyshev(Mean, Sd) UCL	2.343
99% Chebyshev(Mean, Sd) UCL	2.928

Anderson-Darling Test Statistic	3.066
Anderson-Darling 5% Critical Value	0.739
Kolmogorov-Smirnov Test Statistic	0.496
Kolmogorov-Smirnov 5% Critical Value	0.248
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.936
95% Adjusted Gamma UCL	2.047

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 2.045

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics				
Number of Valid Observations	12	Number of Distinct Observations	12	
Raw Statistics		Log-transformed Statistics		
Minimum	65	Minimum of Log Data	4.174	
Maximum	950.8	Maximum of Log Data	6.857	
Mean	413.2	Mean of log Data	5.659	
Median	427.1	SD of log Data	0.962	
SD	321.1			
Coefficient of Variation	0.777			
Skewness	0.537			
Relevant UCL Statistics		Lognormal Distribution Test		
Normal Distribution Test		Shapiro Wilk Test Statistic	0.889	
Shapiro Wilk Test Statistic	0.873	Shapiro Wilk Critical Value	0.859	
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level		
Data appear Normal at 5% Significance Level				
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL	579.6	95% H-UCL	1040	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	991.3	
95% Adjusted-CLT UCL (Chen-1995)	581	97.5% Chebyshev (MVUE) UCL	1233	
95% Modified-t UCL (Johnson-1978)	582	99% Chebyshev (MVUE) UCL	1708	
Gamma Distribution Test		Data Distribution		
k star (bias corrected)	1.192	Data appear Normal at 5% Significance Level		
Theta Star	346.5			
MLE of Mean	413.2			
MLE of Standard Deviation	378.4			
nu star	28.62			
Approximate Chi Square Value (.05)	17.41	Nonparametric Statistics		
Adjusted Level of Significance	0.029	95% CLT UCL	565.6	
Adjusted Chi Square Value	16.09	95% Jackknife UCL	579.6	
		95% Standard Bootstrap UCL	563	
Anderson-Darling Test Statistic	0.597	95% Bootstrap-t UCL	607.3	
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	565.6	
Kolmogorov-Smirnov Test Statistic	0.23	95% Percentile Bootstrap UCL	572.9	
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	571.1	
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	817.2	
		97.5% Chebyshev(Mean, Sd) UCL	992	
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1335	
95% Approximate Gamma UCL	679.2			
95% Adjusted Gamma UCL	735			
Potential UCL to Use		Use 95% Student's-t UCL	579.6	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	1.1	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	0.095
Mean	5.925	Maximum of Log Data	2.303
Median	5	Mean of log Data	1.657
SD	2.696	SD of log Data	0.581
Coefficient of Variation	0.455		
Skewness	0.47		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.743	Shapiro Wilk Test Statistic	0.692
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.323
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	7.318
95% Modified-t UCL (Johnson-1978)	7.34

Assuming Lognormal Distribution

95% H-UCL	9.188
95% Chebyshev (MVUE) UCL	10.7
97.5% Chebyshev (MVUE) UCL	12.69
99% Chebyshev (MVUE) UCL	16.6

Gamma Distribution Test

k star (bias corrected)	3.233
Theta Star	1.833
MLE of Mean	5.925
MLE of Standard Deviation	3.295
nu star	77.59
Approximate Chi Square Value (.05)	58.3
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	55.76

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	7.205
95% Jackknife UCL	7.323
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	9.317
97.5% Chebyshev(Mean, Sd) UCL	10.78
99% Chebyshev(Mean, Sd) UCL	13.67

Anderson-Darling Test Statistic	1.615
Anderson-Darling 5% Critical Value	0.735
Kolmogorov-Smirnov Test Statistic	0.347
Kolmogorov-Smirnov 5% Critical Value	0.246
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.886
95% Adjusted Gamma UCL	8.246

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 9.317

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.048	Minimum of Log Data	-3.037
Maximum	10.71	Maximum of Log Data	2.371
Mean	7.589	Mean of log Data	1.169
Median	10	SD of log Data	2.085
SD	4.509		
Coefficient of Variation	0.594		
Skewness	-1.319		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.594
Shapiro Wilk Test Statistic	0.583	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9.927	95% H-UCL	719.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	71.75
95% Adjusted-CLT UCL (Chen-1995)	9.201	97.5% Chebyshev (MVUE) UCL	94.68
95% Modified-t UCL (Johnson-1978)	9.844	99% Chebyshev (MVUE) UCL	139.7
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.583	Data do not follow a Discernable Distribution (0.05)	
Theta Star	13.01		
MLE of Mean	7.589	Nonparametric Statistics	
MLE of Standard Deviation	9.935	95% CLT UCL	9.73
nu star	14	95% Jackknife UCL	9.927
Approximate Chi Square Value (.05)	6.574	95% Standard Bootstrap UCL	9.658
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	9.712
Adjusted Chi Square Value	5.814	95% Hall's Bootstrap UCL	8.932
Anderson-Darling Test Statistic	2.888	95% Percentile Bootstrap UCL	9.298
Anderson-Darling 5% Critical Value	0.769	95% BCA Bootstrap UCL	9.239
Kolmogorov-Smirnov Test Statistic	0.488	95% Chebyshev(Mean, Sd) UCL	13.26
Kolmogorov-Smirnov 5% Critical Value	0.256	97.5% Chebyshev(Mean, Sd) UCL	15.72
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	20.54
Assuming Gamma Distribution			
95% Approximate Gamma UCL	16.17		
95% Adjusted Gamma UCL	18.28		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	20.54
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0078	Minimum of Log Data	-4.854
Maximum	0.272	Maximum of Log Data	-1.304
Mean	0.14	Mean of log Data	-2.154
Median	0.14	SD of log Data	0.872
SD	0.0562		
Coefficient of Variation	0.403		
Skewness	8E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.452
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.169
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.166
95% Modified-t UCL (Johnson-1978)	0.169

Assuming Lognormal Distribution

95% H-UCL	0.344
95% Chebyshev (MVUE) UCL	0.352
97.5% Chebyshev (MVUE) UCL	0.434
99% Chebyshev (MVUE) UCL	0.595

Gamma Distribution Test

k star (bias corrected)	2.199
Theta Star	0.0635
MLE of Mean	0.14
MLE of Standard Deviation	0.0942
nu star	52.78
Approximate Chi Square Value (.05)	37.09
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	35.09

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.166
95% Jackknife UCL	0.169
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.21
97.5% Chebyshev(Mean, Sd) UCL	0.241
99% Chebyshev(Mean, Sd) UCL	0.301

Anderson-Darling Test Statistic	3.061
Anderson-Darling 5% Critical Value	0.739
Kolmogorov-Smirnov Test Statistic	0.495
Kolmogorov-Smirnov 5% Critical Value	0.248
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.199
95% Adjusted Gamma UCL	0.21

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	14.07	Log-transformed Statistics	
Maximum	542	Minimum of Log Data	2.644
Mean	192	Maximum of Log Data	6.295
Median	194.2	Mean of log Data	4.703
SD	168.8	SD of log Data	1.272
Coefficient of Variation	0.879		
Skewness	0.782		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	279.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	924.3
95% Adjusted-CLT UCL (Chen-1995)	283.9	95% Chebyshev (MVUE) UCL	611.4
95% Modified-t UCL (Johnson-1978)	281.4	97.5% Chebyshev (MVUE) UCL	779.4
		99% Chebyshev (MVUE) UCL	1110

Gamma Distribution Test

k star (bias corrected)	0.833	Data Distribution	
Theta Star	230.6	Data appear Normal at 5% Significance Level	
MLE of Mean	192		
MLE of Standard Deviation	210.4		
nu star	19.99		
Approximate Chi Square Value (.05)	10.84	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	272.2
Adjusted Chi Square Value	9.829	95% Jackknife UCL	279.5
		95% Standard Bootstrap UCL	268.7

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.442	95% Bootstrap-t UCL	299.2
Kolmogorov-Smirnov Test Statistic	0.212	95% Hall's Bootstrap UCL	292.3
Kolmogorov-Smirnov 5% Critical Value	0.252	95% Percentile Bootstrap UCL	271.7
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	283.9
		95% Chebyshev(Mean, Sd) UCL	404.4
		97.5% Chebyshev(Mean, Sd) UCL	496.3
		99% Chebyshev(Mean, Sd) UCL	676.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	354
95% Adjusted Gamma UCL	390.5

Potential UCL to Use

Use 95% Student's-t UCL	279.5
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	2.63
Maximum	24.2
Mean	13.42
Median	13.42
SD	4.599
Coefficient of Variation	0.343
Skewness	0

Log-transformed Statistics

Minimum of Log Data	0.967
Maximum of Log Data	3.186
Mean of log Data	2.51
SD of log Data	0.515

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.507
Shapiro Wilk Critical Value	0.859
Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	15.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	15.6
95% Modified-t UCL (Johnson-1978)	15.8

Assuming Lognormal Distribution

95% H-UCL	19.63
95% Chebyshev (MVUE) UCL	23.08
97.5% Chebyshev (MVUE) UCL	27.07
99% Chebyshev (MVUE) UCL	34.89

Gamma Distribution Test

k star (bias corrected)	4.506
Theta Star	2.977
MLE of Mean	13.42
MLE of Standard Deviation	6.32
nu star	108.1
Approximate Chi Square Value (.05)	85.15
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	82.04

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	15.6
95% Jackknife UCL	15.8
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	19.2
97.5% Chebyshev(Mean, Sd) UCL	21.71
99% Chebyshev(Mean, Sd) UCL	26.62

Anderson-Darling Test Statistic	2.877
Anderson-Darling 5% Critical Value	0.732
Kolmogorov-Smirnov Test Statistic	0.471
Kolmogorov-Smirnov 5% Critical Value	0.246
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	17.04
95% Adjusted Gamma UCL	17.68

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 19.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.196
Maximum	1.76
Mean	0.978
Median	0.978
SD	0.333
Coefficient of Variation	0.341
Skewness	1.8E-15

Log-transformed Statistics

Minimum of Log Data	-1.63
Maximum of Log Data	0.565
Mean of log Data	-0.107
SD of log Data	0.508

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.508
Shapiro Wilk Critical Value	0.859
Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.151
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.136
95% Modified-t UCL (Johnson-1978)	1.151

Assuming Lognormal Distribution

95% H-UCL	1.421
95% Chebyshev (MVUE) UCL	1.672
97.5% Chebyshev (MVUE) UCL	1.959
99% Chebyshev (MVUE) UCL	2.521

Gamma Distribution Test

k star (bias corrected)	4.589
Theta Star	0.213
MLE of Mean	0.978
MLE of Standard Deviation	0.457
nu star	110.1
Approximate Chi Square Value (.05)	86.92
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	83.78

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.136
95% Jackknife UCL	1.151
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	1.398
97.5% Chebyshev(Mean, Sd) UCL	1.579
99% Chebyshev(Mean, Sd) UCL	1.936

Anderson-Darling Test Statistic	2.874
Anderson-Darling 5% Critical Value	0.732
Kolmogorov-Smirnov Test Statistic	0.471
Kolmogorov-Smirnov 5% Critical Value	0.246
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.239
95% Adjusted Gamma UCL	1.286

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 1.398

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	4.79	Minimum of Log Data	1.567
Maximum	40.9	Maximum of Log Data	3.711
Mean	22.85	Mean of log Data	3.047
Median	22.85	SD of log Data	0.495
SD	7.699		
Coefficient of Variation	0.337		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.511
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	26.84
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	26.5
95% Modified-t UCL (Johnson-1978)	26.84

Assuming Lognormal Distribution

95% H-UCL	32.75
95% Chebyshev (MVUE) UCL	38.55
97.5% Chebyshev (MVUE) UCL	45.05
99% Chebyshev (MVUE) UCL	57.81

Gamma Distribution Test

k star (bias corrected)	4.77
Theta Star	4.79
MLE of Mean	22.85
MLE of Standard Deviation	10.46
nu star	114.5
Approximate Chi Square Value (.05)	90.77
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	87.56

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	26.5
95% Jackknife UCL	26.84
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	32.53
97.5% Chebyshev(Mean, Sd) UCL	36.72
99% Chebyshev(Mean, Sd) UCL	44.96

Anderson-Darling Test Statistic	2.868
Anderson-Darling 5% Critical Value	0.732
Kolmogorov-Smirnov Test Statistic	0.47
Kolmogorov-Smirnov 5% Critical Value	0.246
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	28.81
95% Adjusted Gamma UCL	29.87

Potential UCL to Use

Use 95% Student's-t UCL	26.84
or 95% Modified-t UCL	26.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 14-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Americium-241

General Statistics

Number of Valid Observations 12 Number of Distinct Observations 3

Raw Statistics

Minimum	-0.0025	Log-transformed Statistics	
Maximum	1.65	Log Statistics Not Available	
Mean	0.824		
Median	0.824		
SD	0.352		
Coefficient of Variation	0.428		
Skewness	-1.1E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Not Available	
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Student's-t UCL	1.006	Assuming Lognormal Distribution	
Assuming Normal Distribution		95% H-UCL	N/A
95% Student's-t UCL	1.006	95% UCLs (Adjusted for Skewness)	
		95% Adjusted-CLT UCL (Chen 1995)	0.991
		95% Modified-t UCL (Johnson-1978)	1.006

Gamma Distribution Test

Gamma Statistics Not Available Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	1.267	95% CLT UCL	0.991
		95% Jackknife UCL	1.006
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	1.267
		97.5% Chebyshev(Mean, Sd) UCL	1.459
		99% Chebyshev(Mean, Sd) UCL	1.836

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

Minimum	4.1	Log-transformed Statistics	
Maximum	12.07	Minimum of Log Data	1.411
Mean	9.726	Maximum of Log Data	2.491
Median	11	Mean of log Data	2.235
SD	2.417	SD of log Data	0.319
Coefficient of Variation	0.249		
Skewness	-1.537		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.747	Shapiro Wilk Test Statistic	0.694
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.98	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.87
95% Adjusted-CLT UCL (Chen-1995)	10.54	95% Chebyshev (MVUE) UCL	13.77
95% Modified-t UCL (Johnson-1978)	10.93	97.5% Chebyshev (MVUE) UCL	15.5
		99% Chebyshev (MVUE) UCL	18.88

Gamma Distribution Test

k star (bias corrected)	9.703	Data Distribution	
Theta Star	1.002	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.726		
MLE of Standard Deviation	3.122		
nu star	232.9		
Approximate Chi Square Value (.05)	198.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.87
Adjusted Chi Square Value	193.7	95% Jackknife UCL	10.98
		95% Standard Bootstrap UCL	10.82
		95% Bootstrap-t UCL	10.71
		95% Hall's Bootstrap UCL	10.54
		95% Percentile Bootstrap UCL	10.82
		95% BCA Bootstrap UCL	10.57
		95% Chebyshev(Mean, Sd) UCL	12.77
		97.5% Chebyshev(Mean, Sd) UCL	14.08
		99% Chebyshev(Mean, Sd) UCL	16.67

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.661		
Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.373		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.41		
95% Adjusted Gamma UCL	11.69		

Potential UCL to Use

		Use 95% Student's-t UCL	10.98
		or 95% Modified-t UCL	10.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	12.7	Minimum of Log Data	2.542
Maximum	85	Maximum of Log Data	4.443
Mean	64.49	Mean of log Data	4.059
Median	74.29	SD of log Data	0.559
SD	24.47		
Coefficient of Variation	0.379		
Skewness	-0.86		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.812	Shapiro Wilk Test Statistic	0.723
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	77.18	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	98.46
95% Adjusted-CLT UCL (Chen-1995)	74.24	95% Chebyshev (MVUE) UCL	115.1
95% Modified-t UCL (Johnson-1978)	76.88	97.5% Chebyshev (MVUE) UCL	136
		99% Chebyshev (MVUE) UCL	177.1

Gamma Distribution Test

k star (bias corrected)	3.676	Data do not follow a Discernable Distribution (0.05)	
Theta Star	17.55		
MLE of Mean	64.49		
MLE of Standard Deviation	33.64		
nu star	88.22		
Approximate Chi Square Value (.05)	67.56	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	76.11
Adjusted Chi Square Value	64.81	95% Jackknife UCL	77.18
		95% Standard Bootstrap UCL	75.8

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.733	95% Bootstrap-t UCL	75.69
Kolmogorov-Smirnov Test Statistic	0.284	95% Hall's Bootstrap UCL	74.25
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	75.54
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	74.44
		95% Chebyshev(Mean, Sd) UCL	95.28
		97.5% Chebyshev(Mean, Sd) UCL	108.6
		99% Chebyshev(Mean, Sd) UCL	134.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	84.21
95% Adjusted Gamma UCL	87.78

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	95.28
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	10986	Minimum of Log Data	9.304
Maximum	29681	Maximum of Log Data	10.3
Mean	16281	Mean of log Data	9.664
Median	15612	SD of log Data	0.26
SD	4874		
Coefficient of Variation	0.299		
Skewness	2.019		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.917
Shapiro Wilk Test Statistic	0.807	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	18808	95% H-UCL	18880
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21575
95% Adjusted-CLT UCL (Chen-1995)	19471	97.5% Chebyshev (MVUE) UCL	23886
95% Modified-t UCL (Johnson-1978)	18945	99% Chebyshev (MVUE) UCL	28424
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	11.33	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1437		
MLE of Mean	16281		
MLE of Standard Deviation	4837		
nu star	271.9		
Approximate Chi Square Value (.05)	234.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	18595
Adjusted Chi Square Value	229.4	95% Jackknife UCL	18808
		95% Standard Bootstrap UCL	18515
		95% Bootstrap-t UCL	20562
		95% Hall's Bootstrap UCL	29591
		95% Percentile Bootstrap UCL	18578
		95% BCA Bootstrap UCL	19621
		95% Chebyshev(Mean, Sd) UCL	22414
		97.5% Chebyshev(Mean, Sd) UCL	25068
		99% Chebyshev(Mean, Sd) UCL	30281
Anderson-Darling Test Statistic	0.491		
Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.176		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution			
95% Approximate Gamma UCL	18861		
95% Adjusted Gamma UCL	19294		
Potential UCL to Use		Use 95% Approximate Gamma UCL	18861

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.02	Minimum of Log Data	-3.912
Maximum	0.273	Maximum of Log Data	-1.298
Mean	0.147	Mean of log Data	-2.035
Median	0.147	SD of log Data	0.618
SD	0.0539		
Coefficient of Variation	0.368		
Skewness	-2.7E-15		

Warning: There are only 3 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.174	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.243
95% Adjusted-CLT UCL (Chen-1995)	0.172	95% Chebyshev (MVUE) UCL	0.28
95% Modified-t UCL (Johnson-1978)	0.174	97.5% Chebyshev (MVUE) UCL	0.334
		99% Chebyshev (MVUE) UCL	0.44

Gamma Distribution Test

k star (bias corrected)	3.463	Data Distribution	
Theta Star	0.0423	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.147		
MLE of Standard Deviation	0.0787		
nu star	83.11		
Approximate Chi Square Value (.05)	63.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.172
Adjusted Chi Square Value	60.45	95% Jackknife UCL	0.174

Anderson-Darling Test Statistic	2.93	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.479	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.214
		97.5% Chebyshev(Mean, Sd) UCL	0.244
		99% Chebyshev(Mean, Sd) UCL	0.301

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.193		
95% Adjusted Gamma UCL	0.201		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.214

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	65	Minimum of Log Data	4.174
Maximum	304	Maximum of Log Data	5.717
Mean	105.1	Mean of log Data	4.541
Median	82.73	SD of log Data	0.446
SD	66.76		
Coefficient of Variation	0.635		
Skewness	2.786		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.621	Shapiro Wilk Test Statistic	0.795
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	139.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	137
95% Adjusted-CLT UCL (Chen-1995)	153.4	95% Chebyshev (MVUE) UCL	161.4
95% Modified-t UCL (Johnson-1978)	142.3	97.5% Chebyshev (MVUE) UCL	186.9
		99% Chebyshev (MVUE) UCL	236.8

Gamma Distribution Test

k star (bias corrected)	3.461	Data Distribution	
Theta Star	30.37	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	105.1		
MLE of Standard Deviation	56.5		
nu star	83.06		
Approximate Chi Square Value (.05)	63.05	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	136.8
Adjusted Chi Square Value	60.4	95% Jackknife UCL	139.7
		95% Standard Bootstrap UCL	135.7
		95% Bootstrap-t UCL	187.2
		95% Hall's Bootstrap UCL	250.2
		95% Percentile Bootstrap UCL	140.4
		95% BCA Bootstrap UCL	156.3
		95% Chebyshev(Mean, Sd) UCL	189.1
		97.5% Chebyshev(Mean, Sd) UCL	225.5
		99% Chebyshev(Mean, Sd) UCL	296.9

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.124
Anderson-Darling 5% Critical Value	0.734
Kolmogorov-Smirnov Test Statistic	0.249
Kolmogorov-Smirnov 5% Critical Value	0.246
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	138.4
95% Adjusted Gamma UCL	144.5

Potential UCL to Use

Use 95% Student's-t UCL	139.7
or 95% Modified-t UCL	142.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.5	Minimum of Log Data	-0.693
Maximum	5	Maximum of Log Data	1.609
Mean	4.625	Mean of log Data	1.418
Median	5	SD of log Data	0.665
SD	1.299		
Coefficient of Variation	0.281		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.298	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	8.264
95% Adjusted-CLT UCL (Chen-1995)	4.841	95% Chebyshev (MVUE) UCL	9.414
95% Modified-t UCL (Johnson-1978)	5.236	97.5% Chebyshev (MVUE) UCL	11.31
		99% Chebyshev (MVUE) UCL	15.03

Gamma Distribution Test

k star (bias corrected)	3.467	Data Distribution	
Theta Star	1.334	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.625		
MLE of Standard Deviation	2.484		
nu star	83.22		
Approximate Chi Square Value (.05)	63.19	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.242
Adjusted Chi Square Value	60.54	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.148	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.544	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.26
		97.5% Chebyshev(Mean, Sd) UCL	6.967
		99% Chebyshev(Mean, Sd) UCL	8.356

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.091		
95% Adjusted Gamma UCL	6.358		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	6.26
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.015	Minimum of Log Data	-4.2
Maximum	16.69	Maximum of Log Data	2.815
Mean	9.725	Mean of log Data	1.803
Median	10	SD of log Data	1.896
SD	3.612		
Coefficient of Variation	0.371		
Skewness	-1.337		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.581	Shapiro Wilk Test Statistic	0.373
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	549.5
95% Adjusted-CLT UCL (Chen-1995)	11.01	95% Chebyshev (MVUE) UCL	96.32
95% Modified-t UCL (Johnson-1978)	11.53	97.5% Chebyshev (MVUE) UCL	126.4
		99% Chebyshev (MVUE) UCL	185.5

Gamma Distribution Test

k star (bias corrected)	0.956	Data Distribution	
Theta Star	10.18	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.725		
MLE of Standard Deviation	9.949		
nu star	22.93		
Approximate Chi Square Value (.05)	13.04	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.44
Adjusted Chi Square Value	11.92	95% Jackknife UCL	11.6
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.736	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.549	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.251	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.27
		97.5% Chebyshev(Mean, Sd) UCL	16.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	20.1
95% Approximate Gamma UCL	17.1		
95% Adjusted Gamma UCL	18.72		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	20.1
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.75	Minimum of Log Data	-0.288
Maximum	406	Maximum of Log Data	6.006
Mean	203.4	Mean of log Data	4.906
Median	203.4	SD of log Data	1.648
SD	86.4		
Coefficient of Variation	0.425		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.398
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	248.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4236
95% Adjusted-CLT UCL (Chen-1995)	244.4	95% Chebyshev (MVUE) UCL	1390
95% Modified-t UCL (Johnson-1978)	248.2	97.5% Chebyshev (MVUE) UCL	1807
		99% Chebyshev (MVUE) UCL	2627

Gamma Distribution Test

k star (bias corrected)	1.079	Data Distribution	
Theta Star	188.5	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	203.4		
MLE of Standard Deviation	195.8		
nu star	25.89		
Approximate Chi Square Value (.05)	15.29	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	244.4
Adjusted Chi Square Value	14.06	95% Jackknife UCL	248.2
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.431	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.53	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.25	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	312.1
		97.5% Chebyshev(Mean, Sd) UCL	359.1
		99% Chebyshev(Mean, Sd) UCL	451.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	344.3
95% Adjusted Gamma UCL	374.4

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 99% Chebyshev (Mean, Sd) UCL	451.5
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
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Raw Statistics

Minimum	5.05	Log-transformed Statistics	
Maximum	174.9	Minimum of Log Data	1.619
Mean	35.03	Maximum of Log Data	5.164
Median	20	Mean of log Data	3.063
SD	47.83	SD of log Data	0.93
Coefficient of Variation	1.365		
Skewness	2.73		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.573	Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	59.82	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	72.14
95% Adjusted-CLT UCL (Chen-1995)	69.36	95% Chebyshev (MVUE) UCL	70.6
95% Modified-t UCL (Johnson-1978)	61.63	97.5% Chebyshev (MVUE) UCL	87.55
		99% Chebyshev (MVUE) UCL	120.8

Gamma Distribution Test

k star (bias corrected)	0.92	Data Distribution	
Theta Star	38.07	Data appear Lognormal at 5% Significance Level	
MLE of Mean	35.03		
MLE of Standard Deviation	36.52		
nu star	22.08		
Approximate Chi Square Value (.05)	12.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	57.73
Adjusted Chi Square Value	11.3	95% Jackknife UCL	59.82
		95% Standard Bootstrap UCL	57.31
		95% Bootstrap-t UCL	187.4
		95% Hall's Bootstrap UCL	214.1
		95% Percentile Bootstrap UCL	58.5
		95% BCA Bootstrap UCL	72.33
		95% Chebyshev(Mean, Sd) UCL	95.21
		97.5% Chebyshev(Mean, Sd) UCL	121.2
		99% Chebyshev(Mean, Sd) UCL	172.4

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.291		
Anderson-Darling 5% Critical Value	0.753		
Kolmogorov-Smirnov Test Statistic	0.339		
Kolmogorov-Smirnov 5% Critical Value	0.251		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	62.38		
95% Adjusted Gamma UCL	68.41		

Potential UCL to Use

Use 95% H-UCL	72.14
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ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-02.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	6.2	Log-transformed Statistics	
Maximum	25.82	Minimum of Log Data	1.825
Mean	11.83	Maximum of Log Data	3.251
Median	11	Mean of log Data	2.401
SD	5.193	SD of log Data	0.375
Coefficient of Variation	0.439		
Skewness	1.982		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Test Statistic	0.869
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	14.53	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.84
95% Adjusted-CLT UCL (Chen-1995)	15.22	95% Chebyshev (MVUE) UCL	17.4
95% Modified-t UCL (Johnson-1978)	14.67	97.5% Chebyshev (MVUE) UCL	19.83
		99% Chebyshev (MVUE) UCL	24.62

Gamma Distribution Test

k star (bias corrected)	5.514	Data Distribution	
Theta Star	2.146	Data appear Lognormal at 5% Significance Level	
MLE of Mean	11.83		
MLE of Standard Deviation	5.04		
nu star	132.3		
Approximate Chi Square Value (.05)	106.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	14.3
Adjusted Chi Square Value	103.3	95% Jackknife UCL	14.53
		95% Standard Bootstrap UCL	14.2
Anderson-Darling Test Statistic	1.003	95% Bootstrap-t UCL	17.27
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	29.72
Kolmogorov-Smirnov Test Statistic	0.307	95% Percentile Bootstrap UCL	14.47
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	15.51
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	18.37
		97.5% Chebyshev(Mean, Sd) UCL	21.2
		99% Chebyshev(Mean, Sd) UCL	26.75

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.67		
95% Adjusted Gamma UCL	15.17		

Potential UCL to Use

Use 95% Student's-t UCL	14.53
or 95% Modified-t UCL	14.67
or 95% H-UCL	14.84

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	36.91	Minimum of Log Data	3.608
Maximum	85	Maximum of Log Data	4.443
Mean	58.12	Mean of log Data	4.019
Median	54.51	SD of log Data	0.306
SD	18.25		
Coefficient of Variation	0.314		
Skewness	0.605		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.907
Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	67.58	95% H-UCL	69.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	80.67
95% Adjusted-CLT UCL (Chen-1995)	67.77	97.5% Chebyshev (MVUE) UCL	90.45
95% Modified-t UCL (Johnson-1978)	67.73	99% Chebyshev (MVUE) UCL	109.6
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	8.767	Data appear Normal at 5% Significance Level	
Theta Star	6.63		
MLE of Mean	58.12		
MLE of Standard Deviation	19.63		
nu star	210.4		
Approximate Chi Square Value (.05)	177.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	66.79
Adjusted Chi Square Value	173.3	95% Jackknife UCL	67.58
		95% Standard Bootstrap UCL	66.5
Anderson-Darling Test Statistic	0.502	95% Bootstrap-t UCL	69.51
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	66.06
Kolmogorov-Smirnov Test Statistic	0.18	95% Percentile Bootstrap UCL	66.6
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	67.62
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.08
		97.5% Chebyshev(Mean, Sd) UCL	91.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	110.5
95% Approximate Gamma UCL	68.77		
95% Adjusted Gamma UCL	70.58		
Potential UCL to Use		Use 95% Student's-t UCL	67.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	24.29	Minimum of Log Data	3.19
Maximum	258.3	Maximum of Log Data	5.554
Mean	131.5	Mean of log Data	4.601
Median	121.9	SD of log Data	0.854
SD	86.57		
Coefficient of Variation	0.658		
Skewness	0.197		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.874
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	176.4	95% H-UCL	284.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	294.7
95% Adjusted-CLT UCL (Chen-1995)	174.1	97.5% Chebyshev (MVUE) UCL	362.6
95% Modified-t UCL (Johnson-1978)	176.6	99% Chebyshev (MVUE) UCL	495.8
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.517	Data appear Normal at 5% Significance Level	
Theta Star	86.72		
MLE of Mean	131.5		
MLE of Standard Deviation	106.8		
nu star	36.4		
Approximate Chi Square Value (.05)	23.59	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	172.6
Adjusted Chi Square Value	22.03	95% Jackknife UCL	176.4
		95% Standard Bootstrap UCL	171
Anderson-Darling Test Statistic	0.575	95% Bootstrap-t UCL	177.1
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	169.5
Kolmogorov-Smirnov Test Statistic	0.195	95% Percentile Bootstrap UCL	173.5
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	169.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	240.4
		97.5% Chebyshev(Mean, Sd) UCL	287.6
		99% Chebyshev(Mean, Sd) UCL	380.2
Assuming Gamma Distribution			
95% Approximate Gamma UCL	202.9		
95% Adjusted Gamma UCL	217.3		
Potential UCL to Use		Use 95% Student's-t UCL	176.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	13510	Log-transformed Statistics	
Maximum	52658	Minimum of Log Data	9.511
Mean	32092	Maximum of Log Data	10.87
Median	30621	Mean of log Data	10.33
SD	9829	SD of log Data	0.34
Coefficient of Variation	0.306		
Skewness	0.25		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.972	Shapiro Wilk Test Statistic	0.928
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	37188	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	39619
95% Adjusted-CLT UCL (Chen-1995)	36978	95% Chebyshev (MVUE) UCL	46176
95% Modified-t UCL (Johnson-1978)	37222	97.5% Chebyshev (MVUE) UCL	52209
		99% Chebyshev (MVUE) UCL	64059

Gamma Distribution Test

k star (bias corrected)	7.938	Data Distribution	
Theta Star	4043	Data appear Normal at 5% Significance Level	
MLE of Mean	32092		
MLE of Standard Deviation	11390		
nu star	190.5		
Approximate Chi Square Value (.05)	159.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	36760
Adjusted Chi Square Value	155.3	95% Jackknife UCL	37188
		95% Standard Bootstrap UCL	36615
		95% Bootstrap-t UCL	37395
		95% Hall's Bootstrap UCL	38486
		95% Percentile Bootstrap UCL	36587
		95% BCA Bootstrap UCL	36848
		95% Chebyshev(Mean, Sd) UCL	44460
		97.5% Chebyshev(Mean, Sd) UCL	49812
		99% Chebyshev(Mean, Sd) UCL	60324

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.291		
Anderson-Darling 5% Critical Value	0.73		
Kolmogorov-Smirnov Test Statistic	0.162		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	38313		
95% Adjusted Gamma UCL	39378		

Potential UCL to Use

Use 95% Student's-t UCL	37188
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	209.9	Log-transformed Statistics	
Maximum	2668	Minimum of Log Data	5.346
Mean	934.1	Maximum of Log Data	7.889
Median	753	Mean of log Data	6.561
SD	787.4	SD of log Data	0.771
Coefficient of Variation	0.843		
Skewness	1.615		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.772	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1342	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1710
95% Adjusted-CLT UCL (Chen-1995)	1421	95% Chebyshev (MVUE) UCL	1862
95% Modified-t UCL (Johnson-1978)	1360	97.5% Chebyshev (MVUE) UCL	2268
		99% Chebyshev (MVUE) UCL	3066

Gamma Distribution Test

k star (bias corrected)	1.513	Data Distribution	
Theta Star	617.4	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	934.1		
MLE of Standard Deviation	759.4		
nu star	36.31		
Approximate Chi Square Value (.05)	23.52	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1308
Adjusted Chi Square Value	21.96	95% Jackknife UCL	1342
		95% Standard Bootstrap UCL	1300

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.471	95% Bootstrap-t UCL	1963
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	3841
Kolmogorov-Smirnov Test Statistic	0.187	95% Percentile Bootstrap UCL	1322
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	1426
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1925
		97.5% Chebyshev(Mean, Sd) UCL	2354
		99% Chebyshev(Mean, Sd) UCL	3196

Assuming Gamma Distribution

95% Approximate Gamma UCL	1442
95% Adjusted Gamma UCL	1545

Potential UCL to Use

Use 95% Approximate Gamma UCL	1442
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.267	Minimum of Log Data	-1.321
Maximum	10	Maximum of Log Data	2.303
Mean	9.189	Mean of log Data	2.001
Median	10	SD of log Data	1.046
SD	2.81		
Coefficient of Variation	0.306		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.65	95% H-UCL	32.89
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.93
95% Adjusted-CLT UCL (Chen-1995)	9.656	97.5% Chebyshev (MVUE) UCL	36.26
95% Modified-t UCL (Johnson-1978)	10.51	99% Chebyshev (MVUE) UCL	50.65

Gamma Distribution Test

k star (bias corrected)	1.896	Data Distribution	
Theta Star	4.846	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.189		
MLE of Standard Deviation	6.673		
nu star	45.51		
Approximate Chi Square Value (.05)	31.04	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.52
Adjusted Chi Square Value	29.22	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.223	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.553	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.72
		97.5% Chebyshev(Mean, Sd) UCL	14.25
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.26
95% Approximate Gamma UCL	13.48		
95% Adjusted Gamma UCL	14.31		

Potential UCL to Use

Recommended UCL exceeds the maximum observation Use 95% Chebyshev (Mean, Sd) UCL 12.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	65	Minimum of Log Data	4.174
Maximum	1381	Maximum of Log Data	7.231
Mean	482.2	Mean of log Data	5.86
Median	380.8	SD of log Data	0.912
SD	377.5		
Coefficient of Variation	0.783		
Skewness	1.337		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Test Statistic	0.875	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	677.9	95% H-UCL	1134
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1127
95% Adjusted-CLT UCL (Chen-1995)	706.4	97.5% Chebyshev (MVUE) UCL	1395
95% Modified-t UCL (Johnson-1978)	684.9	99% Chebyshev (MVUE) UCL	1921
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.346	Data appear Normal at 5% Significance Level	
Theta Star	358.3		
MLE of Mean	482.2		
MLE of Standard Deviation	415.7		
nu star	32.3		
Approximate Chi Square Value (.05)	20.31	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	661.5
Adjusted Chi Square Value	18.87	95% Jackknife UCL	677.9
		95% Standard Bootstrap UCL	652.7
		95% Bootstrap-t UCL	762.6
Anderson-Darling Test Statistic	0.301	95% Hall's Bootstrap UCL	811.9
Anderson-Darling 5% Critical Value	0.744	95% Percentile Bootstrap UCL	665
Kolmogorov-Smirnov Test Statistic	0.154	95% BCA Bootstrap UCL	696.5
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Chebyshev(Mean, Sd) UCL	957.2
Data appear Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	1163
		99% Chebyshev(Mean, Sd) UCL	1567
Assuming Gamma Distribution			
95% Approximate Gamma UCL	766.9		
95% Adjusted Gamma UCL	825.4		
Potential UCL to Use		Use 95% Student's-t UCL	677.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.39	Minimum of Log Data	-0.942
Maximum	5	Maximum of Log Data	1.609
Mean	4.616	Mean of log Data	1.397
Median	5	SD of log Data	0.736
SD	1.331		
Coefficient of Variation	0.288		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.306	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.173
95% Adjusted-CLT UCL (Chen-1995)	4.837	95% Chebyshev (MVUE) UCL	10.16
95% Modified-t UCL (Johnson-1978)	5.242	97.5% Chebyshev (MVUE) UCL	12.32
		99% Chebyshev (MVUE) UCL	16.57

Gamma Distribution Test

k star (bias corrected)	3.002	Data Distribution	
Theta Star	1.538	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.616		
MLE of Standard Deviation	2.664		
nu star	72.05		
Approximate Chi Square Value (.05)	53.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.248
Adjusted Chi Square Value	51.07	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	6.29
		97.5% Chebyshev(Mean, Sd) UCL	7.015
		99% Chebyshev(Mean, Sd) UCL	8.438

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.161		
Anderson-Darling 5% Critical Value	0.736		
Kolmogorov-Smirnov Test Statistic	0.545		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.216		
95% Adjusted Gamma UCL	6.512		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	6.29
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
 Thorium-230

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Thorium-230 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	17.91	Log-transformed Statistics	
Maximum	524.2	Minimum of Log Data	2.885
Mean	200	Maximum of Log Data	6.262
Median	159.2	Mean of log Data	4.725
SD	180.1	SD of log Data	1.256
Coefficient of Variation	0.901		
Skewness	0.558		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.885	Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	293.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	897.8
95% Adjusted-CLT UCL (Chen-1995)	294.4	95% Chebyshev (MVUE) UCL	608.5
95% Modified-t UCL (Johnson-1978)	294.7	97.5% Chebyshev (MVUE) UCL	774.9
		99% Chebyshev (MVUE) UCL	1102

Gamma Distribution Test

k star (bias corrected)	0.81	Data Distribution	
Theta Star	246.9	Data appear Normal at 5% Significance Level	
MLE of Mean	200		
MLE of Standard Deviation	222.2		
nu star	19.44		
Approximate Chi Square Value (.05)	10.44	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	285.5
Adjusted Chi Square Value	9.446	95% Jackknife UCL	293.3

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.48	95% Standard Bootstrap UCL	282
Anderson-Darling 5% Critical Value	0.757	95% Bootstrap-t UCL	313
Kolmogorov-Smirnov Test Statistic	0.164	95% Hall's Bootstrap UCL	281.4
Kolmogorov-Smirnov 5% Critical Value	0.252	95% Percentile Bootstrap UCL	284.5
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	284.4
		95% Chebyshev(Mean, Sd) UCL	426.6
		97.5% Chebyshev(Mean, Sd) UCL	524.6
		99% Chebyshev(Mean, Sd) UCL	717.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	372.4
95% Adjusted Gamma UCL	411.5

Potential UCL to Use

Use 95% Student's-t UCL	293.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options			
From File		14-03.wst	
Full Precision		OFF	
Confidence Coefficient		95%	
Number of Bootstrap Operations		2000	
Arsenic			
General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	6
Raw Statistics		Log-transformed Statistics	
Minimum	7.2	Minimum of Log Data	1.974
Maximum	16.84	Maximum of Log Data	2.824
Mean	11.63	Mean of log Data	2.432
Median	11	SD of log Data	0.218
SD	2.583		
Coefficient of Variation	0.222		
Skewness	0.815		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Test Statistic	0.826	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	12.97	95% H-UCL	13.17
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.84
95% Adjusted-CLT UCL (Chen-1995)	13.04	97.5% Chebyshev (MVUE) UCL	16.23
95% Modified-t UCL (Johnson-1978)	13	99% Chebyshev (MVUE) UCL	18.96
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	17.28	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.673		
MLE of Mean	11.63		
MLE of Standard Deviation	2.798		
nu star	414.8		
Approximate Chi Square Value (.05)	368.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12.86
Adjusted Chi Square Value	361.9	95% Jackknife UCL	12.97
		95% Standard Bootstrap UCL	12.74
		95% Bootstrap-t UCL	13.71
Anderson-Darling Test Statistic	1.133	95% Hall's Bootstrap UCL	15.56
Anderson-Darling 5% Critical Value	0.732	95% Percentile Bootstrap UCL	12.89
Kolmogorov-Smirnov Test Statistic	0.327	95% BCA Bootstrap UCL	12.97
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Chebyshev(Mean, Sd) UCL	14.88
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	16.29
		99% Chebyshev(Mean, Sd) UCL	19.05
Assuming Gamma Distribution			
95% Approximate Gamma UCL	13.09		
95% Adjusted Gamma UCL	13.33		
Potential UCL to Use		Use 95% Student's-t UCL	12.97
		or 95% Modified-t UCL	13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	25	Minimum of Log Data	3.219
Maximum	85	Maximum of Log Data	4.443
Mean	70.43	Mean of log Data	4.205
Median	77.57	SD of log Data	0.363
SD	19.12		
Coefficient of Variation	0.271		
Skewness	-1.393		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.791	Shapiro Wilk Test Statistic	0.711
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	80.34	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	89.03
95% Adjusted-CLT UCL (Chen-1995)	77.13	95% Chebyshev (MVUE) UCL	104.2
95% Modified-t UCL (Johnson-1978)	79.97	97.5% Chebyshev (MVUE) UCL	118.4
		99% Chebyshev (MVUE) UCL	146.4

Gamma Distribution Test

k star (bias corrected)	7.802	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.027		
MLE of Mean	70.43		
MLE of Standard Deviation	25.21		
nu star	187.2		
Approximate Chi Square Value (.05)	156.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	79.5
Adjusted Chi Square Value	152.3	95% Jackknife UCL	80.34
		95% Standard Bootstrap UCL	78.9
Anderson-Darling Test Statistic	1.21	95% Bootstrap-t UCL	78.4
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	77.62
Kolmogorov-Smirnov Test Statistic	0.266	95% Percentile Bootstrap UCL	78.76
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	77.46
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	94.48
		97.5% Chebyshev(Mean, Sd) UCL	104.9
		99% Chebyshev(Mean, Sd) UCL	125.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	84.21		
95% Adjusted Gamma UCL	86.58		

Potential UCL to Use

Use 95% Student's-t UCL	80.34
or 95% Modified-t UCL	79.97

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	7.9	Minimum of Log Data	2.067
Maximum	195.6	Maximum of Log Data	5.276
Mean	98.27	Mean of log Data	4.294
Median	92.48	SD of log Data	0.96
SD	59.79		
Coefficient of Variation	0.608		
Skewness	0.0983		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	129.3	95% H-UCL	264.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	252.6
95% Adjusted-CLT UCL (Chen-1995)	127.2	97.5% Chebyshev (MVUE) UCL	314.1
95% Modified-t UCL (Johnson-1978)	129.3	99% Chebyshev (MVUE) UCL	434.9
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.447	Data appear Normal at 5% Significance Level	
Theta Star	67.93		
MLE of Mean	98.27		
MLE of Standard Deviation	81.7		
nu star	34.72		
Approximate Chi Square Value (.05)	22.24	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	126.7
Adjusted Chi Square Value	20.72	95% Jackknife UCL	129.3
		95% Standard Bootstrap UCL	125.7
		95% Bootstrap-t UCL	130.5
		95% Hall's Bootstrap UCL	126.2
		95% Percentile Bootstrap UCL	125.5
		95% BCA Bootstrap UCL	125.6
		95% Chebyshev(Mean, Sd) UCL	173.5
		97.5% Chebyshev(Mean, Sd) UCL	206
		99% Chebyshev(Mean, Sd) UCL	270
Assuming Gamma Distribution			
95% Approximate Gamma UCL	153.4		
95% Adjusted Gamma UCL	164.6		
Potential UCL to Use		Use 95% Student's-t UCL	129.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	18071	Log-transformed Statistics	
Maximum	54899	Minimum of Log Data	9.802
Mean	29527	Maximum of Log Data	10.91
Median	26323	Mean of log Data	10.25
SD	10223	SD of log Data	0.312
Coefficient of Variation	0.346		
Skewness	1.483		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.87	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	34827	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	35483
95% Adjusted-CLT UCL (Chen-1995)	35732	95% Chebyshev (MVUE) UCL	41121
95% Modified-t UCL (Johnson-1978)	35038	97.5% Chebyshev (MVUE) UCL	46175
		99% Chebyshev (MVUE) UCL	56102

Gamma Distribution Test

k star (bias corrected)	8.081	Data Distribution	
Theta Star	3654	Data appear Normal at 5% Significance Level	
MLE of Mean	29527		
MLE of Standard Deviation	10387		
nu star	194		
Approximate Chi Square Value (.05)	162.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	34381
Adjusted Chi Square Value	158.4	95% Jackknife UCL	34827
		95% Standard Bootstrap UCL	34365
		95% Bootstrap-t UCL	37825
		95% Hall's Bootstrap UCL	40850
		95% Percentile Bootstrap UCL	34607
		95% BCA Bootstrap UCL	35304
		95% Chebyshev(Mean, Sd) UCL	42391
		97.5% Chebyshev(Mean, Sd) UCL	47957
		99% Chebyshev(Mean, Sd) UCL	58890

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.39		
Anderson-Darling 5% Critical Value	0.73		
Kolmogorov-Smirnov Test Statistic	0.219		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	35192		
95% Adjusted Gamma UCL	36162		

Potential UCL to Use

Use 95% Student's-t UCL	34827
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	278.2	Log-transformed Statistics	
Maximum	1548	Minimum of Log Data	5.628
Mean	824.2	Maximum of Log Data	7.345
Median	706.4	Mean of log Data	6.57
SD	449.6	SD of log Data	0.574
Coefficient of Variation	0.545		
Skewness	0.599		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.887	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1057	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1238
95% Adjusted-CLT UCL (Chen-1995)	1062	95% Chebyshev (MVUE) UCL	1444
95% Modified-t UCL (Johnson-1978)	1061	97.5% Chebyshev (MVUE) UCL	1711
		99% Chebyshev (MVUE) UCL	2234

Gamma Distribution Test

k star (bias corrected)	2.772	Data Distribution	
Theta Star	297.3	Data appear Normal at 5% Significance Level	
MLE of Mean	824.2		
MLE of Standard Deviation	495		
nu star	66.52		
Approximate Chi Square Value (.05)	48.75	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1038
Adjusted Chi Square Value	46.44	95% Jackknife UCL	1057
		95% Standard Bootstrap UCL	1030
		95% Bootstrap-t UCL	1097
		95% Hall's Bootstrap UCL	1032
		95% Percentile Bootstrap UCL	1038
		95% BCA Bootstrap UCL	1058
		95% Chebyshev(Mean, Sd) UCL	1390
		97.5% Chebyshev(Mean, Sd) UCL	1635
		99% Chebyshev(Mean, Sd) UCL	2116

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.37		
Anderson-Darling 5% Critical Value	0.737		
Kolmogorov-Smirnov Test Statistic	0.165		
Kolmogorov-Smirnov 5% Critical Value	0.247		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	1125		
95% Adjusted Gamma UCL	1181		

Potential UCL to Use

Use 95% Student's-t UCL	1057
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
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Raw Statistics

Minimum	7.48
Maximum	10
Mean	9.79
Median	10
SD	0.727
Coefficient of Variation	0.0743
Skewness	-3.464

Log-transformed Statistics

Minimum of Log Data	2.012
Maximum of Log Data	2.303
Mean of log Data	2.278
SD of log Data	0.0838

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.17
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9.911
95% Modified-t UCL (Johnson-1978)	10.13

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	10.83
97.5% Chebyshev (MVUE) UCL	11.27
99% Chebyshev (MVUE) UCL	12.15

Gamma Distribution Test

k star (bias corrected)	126.3
Theta Star	0.0775
MLE of Mean	9.79
MLE of Standard Deviation	0.871
nu star	3032
Approximate Chi Square Value (.05)	2905
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	2886

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	4.085
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.535
Kolmogorov-Smirnov 5% Critical Value	0.245

Nonparametric Statistics

95% CLT UCL	10.14
95% Jackknife UCL	N/A
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	10.71
97.5% Chebyshev(Mean, Sd) UCL	11.1
99% Chebyshev(Mean, Sd) UCL	11.88

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.22
95% Adjusted Gamma UCL	10.28

Potential UCL to Use

Use 95% Student's-t UCL	10.17
or 95% Modified-t UCL	10.13

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	2.8	Minimum of Log Data	1.03
Maximum	28.67	Maximum of Log Data	3.356
Mean	15.12	Mean of log Data	2.622
Median	15	SD of log Data	0.535
SD	5.523		
Coefficient of Variation	0.365		
Skewness	0.398		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.598	Shapiro Wilk Test Statistic	0.515
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	17.99	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	22.59
95% Adjusted-CLT UCL (Chen-1995)	17.94	95% Chebyshev (MVUE) UCL	26.51
95% Modified-t UCL (Johnson-1978)	18.02	97.5% Chebyshev (MVUE) UCL	31.2
		99% Chebyshev (MVUE) UCL	40.4

Gamma Distribution Test

k star (bias corrected)	4.165	Data Distribution	
Theta Star	3.631	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	15.12		
MLE of Standard Deviation	7.41		
nu star	99.96		
Approximate Chi Square Value (.05)	77.89	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	17.74
Adjusted Chi Square Value	74.93	95% Jackknife UCL	17.99
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.845	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.466	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.07
		97.5% Chebyshev(Mean, Sd) UCL	25.08
		99% Chebyshev(Mean, Sd) UCL	30.99

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.41
95% Adjusted Gamma UCL	20.18

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 22.07

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	18.2	Minimum of Log Data	2.901
Maximum	1198	Maximum of Log Data	7.089
Mean	389.9	Mean of log Data	5.458
Median	248.4	SD of log Data	1.204
SD	359.7		
Coefficient of Variation	0.923		
Skewness	1.175		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.95
Shapiro Wilk Test Statistic	0.876	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	576.4	95% H-UCL	1604
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1169
95% Adjusted-CLT UCL (Chen-1995)	598.3	97.5% Chebyshev (MVUE) UCL	1483
95% Modified-t UCL (Johnson-1978)	582.2	99% Chebyshev (MVUE) UCL	2101
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.898	Data appear Normal at 5% Significance Level	
Theta Star	434.3		
MLE of Mean	389.9		
MLE of Standard Deviation	411.5		
nu star	21.54		
Approximate Chi Square Value (.05)	12	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	560.7
Adjusted Chi Square Value	10.92	95% Jackknife UCL	576.4
		95% Standard Bootstrap UCL	551.2
Anderson-Darling Test Statistic	0.172	95% Bootstrap-t UCL	649.3
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	601.4
Kolmogorov-Smirnov Test Statistic	0.113	95% Percentile Bootstrap UCL	562.8
Kolmogorov-Smirnov 5% Critical Value	0.252	95% BCA Bootstrap UCL	586.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	842.5
		97.5% Chebyshev(Mean, Sd) UCL	1038
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1423
95% Approximate Gamma UCL	700.1		
95% Adjusted Gamma UCL	768.9		
Potential UCL to Use		Use 95% Student's-t UCL	576.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.065
Maximum	10
Mean	5.422
Median	5
SD	2.562
Coefficient of Variation	0.473
Skewness	0.243

Log-transformed Statistics

Minimum of Log Data	-2.733
Maximum of Log Data	2.303
Mean of log Data	1.363
SD of log Data	1.317

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.698	Shapiro Wilk Test Statistic	0.468
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.75
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	6.694
95% Modified-t UCL (Johnson-1978)	6.759

Assuming Lognormal Distribution

95% H-UCL	37.72
95% Chebyshev (MVUE) UCL	23.28
97.5% Chebyshev (MVUE) UCL	29.77
99% Chebyshev (MVUE) UCL	42.51

Gamma Distribution Test

k star (bias corrected)	1.311
Theta Star	4.135
MLE of Mean	5.422
MLE of Standard Deviation	4.735
nu star	31.47
Approximate Chi Square Value (.05)	19.65
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	18.24

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	2.583
Anderson-Darling 5% Critical Value	0.744
Kolmogorov-Smirnov Test Statistic	0.48
Kolmogorov-Smirnov 5% Critical Value	0.249

Nonparametric Statistics

95% CLT UCL	6.639
95% Jackknife UCL	6.75
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	8.646
97.5% Chebyshev(Mean, Sd) UCL	10.04
99% Chebyshev(Mean, Sd) UCL	12.78

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.682
95% Adjusted Gamma UCL	9.356

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	8.646
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	5.5	Log-transformed Statistics	
Maximum	349.2	Minimum of Log Data	1.705
Mean	79.73	Maximum of Log Data	5.856
Median	29.32	Mean of log Data	3.583
SD	109.6	SD of log Data	1.301
Coefficient of Variation	1.375		
Skewness	1.762		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.691	Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	136.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	330.2
95% Adjusted-CLT UCL (Chen-1995)	149	95% Chebyshev (MVUE) UCL	209
95% Modified-t UCL (Johnson-1978)	139.2	97.5% Chebyshev (MVUE) UCL	267
		99% Chebyshev (MVUE) UCL	380.8

Gamma Distribution Test

k star (bias corrected)	0.62	Data Distribution	
Theta Star	128.7	Data appear Lognormal at 5% Significance Level	
MLE of Mean	79.73		
MLE of Standard Deviation	101.3		
nu star	14.87		
Approximate Chi Square Value (.05)	7.174	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	131.8
Adjusted Chi Square Value	6.374	95% Jackknife UCL	136.6

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.825	95% Standard Bootstrap UCL	130.1
Anderson-Darling 5% Critical Value	0.766	95% Bootstrap-t UCL	176.2
Kolmogorov-Smirnov Test Statistic	0.284	95% Hall's Bootstrap UCL	123.8
Kolmogorov-Smirnov 5% Critical Value	0.255	95% Percentile Bootstrap UCL	135.5
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	147.3
		95% Chebyshev(Mean, Sd) UCL	217.7
		97.5% Chebyshev(Mean, Sd) UCL	277.4
		99% Chebyshev(Mean, Sd) UCL	394.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	165.3
95% Adjusted Gamma UCL	186

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	217.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-04.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	6
Raw Statistics		Log-transformed Statistics	
Minimum	8.8	Minimum of Log Data	2.175
Maximum	20.75	Maximum of Log Data	3.033
Mean	11.8	Mean of log Data	2.446
Median	11	SD of log Data	0.209
SD	2.989		
Coefficient of Variation	0.253		
Skewness	2.592		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.617	Shapiro Wilk Test Statistic	0.694
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.28	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.17
95% Adjusted-CLT UCL (Chen-1995)	13.8	95% Chebyshev (MVUE) UCL	14.76
95% Modified-t UCL (Johnson-1978)	13.38	97.5% Chebyshev (MVUE) UCL	16.05
		99% Chebyshev (MVUE) UCL	18.59

Gamma Distribution Test

k star (bias corrected)	17.04	Data Distribution	
Theta Star	0.693	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.8		
MLE of Standard Deviation	2.859	Nonparametric Statistics	
nu star	443.1	95% CLT UCL	13.17
Approximate Chi Square Value (.05)	395.3	95% Jackknife UCL	13.28
Adjusted Level of Significance	0.0301	95% Standard Bootstrap UCL	13.11
Adjusted Chi Square Value	388.9	95% Bootstrap-t UCL	16.57

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.087	95% Hall's Bootstrap UCL	22.61
Anderson-Darling 5% Critical Value	0.733	95% Percentile Bootstrap UCL	13.19
Kolmogorov-Smirnov Test Statistic	0.394	95% BCA Bootstrap UCL	13.76
Kolmogorov-Smirnov 5% Critical Value	0.236	95% Chebyshev(Mean, Sd) UCL	15.42
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	16.98
		99% Chebyshev(Mean, Sd) UCL	20.05

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.23
95% Adjusted Gamma UCL	13.45

Potential UCL to Use

Use 95% Student's-t UCL	13.28
or 95% Modified-t UCL	13.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	36.37	Minimum of Log Data	3.594
Maximum	85	Maximum of Log Data	4.443
Mean	60.42	Mean of log Data	4.048
Median	54.54	SD of log Data	0.341
SD	20.18		
Coefficient of Variation	0.334		
Skewness	0.225		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	0.866		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	70.4	95% H-UCL	73.57
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	85.71
95% Adjusted-CLT UCL (Chen-1995)	70	97.5% Chebyshev (MVUE) UCL	96.64
95% Modified-t UCL (Johnson-1978)	70.46	99% Chebyshev (MVUE) UCL	118.1
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	7.43	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	8.132		
MLE of Mean	60.42		
MLE of Standard Deviation	22.17		
nu star	193.2		
Approximate Chi Square Value (.05)	162	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	69.63
Adjusted Chi Square Value	158	95% Jackknife UCL	70.4
		95% Standard Bootstrap UCL	69.35
Anderson-Darling Test Statistic	0.752	95% Bootstrap-t UCL	71.13
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	68.72
Kolmogorov-Smirnov Test Statistic	0.201	95% Percentile Bootstrap UCL	69.12
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	69.2
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	84.82
		97.5% Chebyshev(Mean, Sd) UCL	95.38
		99% Chebyshev(Mean, Sd) UCL	116.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	72.04		
95% Adjusted Gamma UCL	73.89		
Potential UCL to Use		Use 95% Approximate Gamma UCL	72.04

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	13
Raw Statistics		Log-transformed Statistics	
Minimum	29.72	Minimum of Log Data	3.392
Maximum	1099	Maximum of Log Data	7.002
Mean	204.1	Mean of log Data	4.818
Median	115	SD of log Data	0.955
SD	282.2		
Coefficient of Variation	1.383		
Skewness	3.058		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Test Statistic	0.582	Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	343.6	95% H-UCL	418.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	416.7
95% Adjusted-CLT UCL (Chen-1995)	403.8	97.5% Chebyshev (MVUE) UCL	516.4
95% Modified-t UCL (Johnson-1978)	354.7	99% Chebyshev (MVUE) UCL	712.4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.925	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	220.6		
MLE of Mean	204.1		
MLE of Standard Deviation	212.2		
nu star	24.05		
Approximate Chi Square Value (.05)	13.89	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	332.8
Adjusted Chi Square Value	12.8	95% Jackknife UCL	343.6
		95% Standard Bootstrap UCL	326.1
		95% Bootstrap-t UCL	610
		95% Hall's Bootstrap UCL	807.6
		95% Percentile Bootstrap UCL	348.8
		95% BCA Bootstrap UCL	421.5
		95% Chebyshev(Mean, Sd) UCL	545.3
		97.5% Chebyshev(Mean, Sd) UCL	692.9
		99% Chebyshev(Mean, Sd) UCL	982.9
Anderson-Darling Test Statistic	0.671		
Anderson-Darling 5% Critical Value	0.755		
Kolmogorov-Smirnov Test Statistic	0.169		
Kolmogorov-Smirnov 5% Critical Value	0.242		
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution			
95% Approximate Gamma UCL	353.5		
95% Adjusted Gamma UCL	383.6		
Potential UCL to Use		Use 95% Approximate Gamma UCL	353.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
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Raw Statistics

Minimum	14880	Log-transformed Statistics	
Maximum	62968	Minimum of Log Data	9.608
Mean	32078	Maximum of Log Data	11.05
Median	32463	Mean of log Data	10.29
SD	13678	SD of log Data	0.427
Coefficient of Variation	0.426		
Skewness	0.919		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.926	Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	38840	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	41561
95% Adjusted-CLT UCL (Chen-1995)	39352	95% Chebyshev (MVUE) UCL	49017
95% Modified-t UCL (Johnson-1978)	39001	97.5% Chebyshev (MVUE) UCL	56332
		99% Chebyshev (MVUE) UCL	70701

Gamma Distribution Test

k star (bias corrected)	4.828	Data Distribution	
Theta Star	6644	Data appear Normal at 5% Significance Level	
MLE of Mean	32078		
MLE of Standard Deviation	14599		
nu star	125.5		
Approximate Chi Square Value (.05)	100.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	38318
Adjusted Chi Square Value	97.48	95% Jackknife UCL	38840
		95% Standard Bootstrap UCL	38001
		95% Bootstrap-t UCL	40353
		95% Hall's Bootstrap UCL	43351
		95% Percentile Bootstrap UCL	38091
		95% BCA Bootstrap UCL	39229
		95% Chebyshev(Mean, Sd) UCL	48614
		97.5% Chebyshev(Mean, Sd) UCL	55769
		99% Chebyshev(Mean, Sd) UCL	69824

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.246		
Kolmogorov-Smirnov Test Statistic	0.735		
Kolmogorov-Smirnov 5% Critical Value	0.144		
Data appear Gamma Distributed at 5% Significance Level	0.237		

Assuming Gamma Distribution

95% Approximate Gamma UCL	40007		
95% Adjusted Gamma UCL	41308		

Potential UCL to Use

Use 95% Student's-t UCL	38840
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.487	Minimum of Log Data	-0.719
Maximum	10	Maximum of Log Data	2.303
Mean	9.268	Mean of log Data	2.07
Median	10	SD of log Data	0.838
SD	2.638		
Coefficient of Variation	0.285		
Skewness	-3.606		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.311	Shapiro Wilk Test Statistic	0.311
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.57
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9.69
95% Modified-t UCL (Johnson-1978)	10.45

Assuming Lognormal Distribution

95% H-UCL	21.02
95% Chebyshev (MVUE) UCL	22.59
97.5% Chebyshev (MVUE) UCL	27.65
99% Chebyshev (MVUE) UCL	37.6

Gamma Distribution Test

k star (bias corrected)	2.63
Theta Star	3.523
MLE of Mean	9.268
MLE of Standard Deviation	5.715
nu star	68.39
Approximate Chi Square Value (.05)	50.36
Adjusted Level of Significance	0.0301
Adjusted Chi Square Value	48.16

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	4.585
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.55
Kolmogorov-Smirnov 5% Critical Value	0.238
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	10.47
95% Jackknife UCL	N/A
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	12.46
97.5% Chebyshev(Mean, Sd) UCL	13.84
99% Chebyshev(Mean, Sd) UCL	16.55

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.59
95% Adjusted Gamma UCL	13.16

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 12.46

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

13

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
Raw Statistics		Log-transformed Statistics	
Minimum	151.2	Minimum of Log Data	5.018
Maximum	1591	Maximum of Log Data	7.372
Mean	504.9	Mean of log Data	5.998
Median	383	SD of log Data	0.675
SD	396.9		
Coefficient of Variation	0.786		
Skewness	1.918		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.795	Shapiro Wilk Critical Value	0.866
Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	701.1	95% H-UCL	797.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	917.6
95% Adjusted-CLT UCL (Chen-1995)	748.6	97.5% Chebyshev (MVUE) UCL	1100
95% Modified-t UCL (Johnson-1978)	710.9	99% Chebyshev (MVUE) UCL	1459
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.868	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	270.3		
MLE of Mean	504.9		
MLE of Standard Deviation	369.5		
nu star	48.56		
Approximate Chi Square Value (.05)	33.57	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	686
Adjusted Chi Square Value	31.8	95% Jackknife UCL	701.1
Anderson-Darling Test Statistic	0.386	95% Standard Bootstrap UCL	678.2
Anderson-Darling 5% Critical Value	0.742	95% Bootstrap-t UCL	860.8
Kolmogorov-Smirnov Test Statistic	0.162	95% Hall's Bootstrap UCL	1332
Kolmogorov-Smirnov 5% Critical Value	0.239	95% Percentile Bootstrap UCL	690.1
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	734.9
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	984.8
95% Approximate Gamma UCL	730.5	97.5% Chebyshev(Mean, Sd) UCL	1192
95% Adjusted Gamma UCL	771.2	99% Chebyshev(Mean, Sd) UCL	1600
Potential UCL to Use		Use 95% Approximate Gamma UCL	730.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	2.6	Minimum of Log Data	0.956
Maximum	10	Maximum of Log Data	2.303
Mean	5.585	Mean of log Data	1.666
Median	5	SD of log Data	0.335
SD	2.068		
Coefficient of Variation	0.37		
Skewness	1.599		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.617	Shapiro Wilk Test Statistic	0.673
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.607	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.75
95% Adjusted-CLT UCL (Chen-1995)	6.8	95% Chebyshev (MVUE) UCL	7.854
95% Modified-t UCL (Johnson-1978)	6.649	97.5% Chebyshev (MVUE) UCL	8.843
		99% Chebyshev (MVUE) UCL	10.78

Gamma Distribution Test

k star (bias corrected)	7.268	Data Distribution	
Theta Star	0.768	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.585		
MLE of Standard Deviation	2.072		
nu star	189		
Approximate Chi Square Value (.05)	158.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	6.528
Adjusted Chi Square Value	154.2	95% Jackknife UCL	6.607

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.53	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.434	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.237	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	8.085
		97.5% Chebyshev(Mean, Sd) UCL	9.166
		99% Chebyshev(Mean, Sd) UCL	11.29

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.672		
95% Adjusted Gamma UCL	6.846		

Potential UCL to Use

Use 95% Student's-t UCL	6.607
or 95% Modified-t UCL	6.649

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1.2	Minimum of Log Data	0.182
Maximum	11.7	Maximum of Log Data	2.46
Mean	9.454	Mean of log Data	2.152
Median	10	SD of log Data	0.593
SD	2.524		
Coefficient of Variation	0.267		
Skewness	-3.363		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.414	Shapiro Wilk Test Statistic	0.353
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.01
95% Adjusted-CLT UCL (Chen-1995)	9.908	95% Chebyshev (MVUE) UCL	17.59
95% Modified-t UCL (Johnson-1978)	10.59	97.5% Chebyshev (MVUE) UCL	20.84
		99% Chebyshev (MVUE) UCL	27.21

Gamma Distribution Test

k star (bias corrected)	4.23	Data Distribution	
Theta Star	2.235	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.454		
MLE of Standard Deviation	4.597		
nu star	110		
Approximate Chi Square Value (.05)	86.77	Nonparametric Statistics	
Adjusted Level of Significance	0.0301	95% CLT UCL	10.61
Adjusted Chi Square Value	83.84	95% Jackknife UCL	10.7
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.078	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.531	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.51
		97.5% Chebyshev(Mean, Sd) UCL	13.83
		99% Chebyshev(Mean, Sd) UCL	16.42
Assuming Gamma Distribution			
95% Approximate Gamma UCL	11.98		
95% Adjusted Gamma UCL	12.4		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	12.51
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Thorium-230 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
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Raw Statistics

Minimum	93	Log-transformed Statistics	
Maximum	663.2	Minimum of Log Data	4.533
Mean	270.1	Maximum of Log Data	6.497
Median	187.2	Mean of log Data	5.428
SD	172.7	SD of log Data	0.597
Coefficient of Variation	0.64		
Skewness	1.22		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	355.4	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	399.7
95% Adjusted-CLT UCL (Chen-1995)	366.2	95% Chebyshev (MVUE) UCL	468.1
95% Modified-t UCL (Johnson-1978)	358.1	97.5% Chebyshev (MVUE) UCL	554.8
		99% Chebyshev (MVUE) UCL	724.9

Gamma Distribution Test

k star (bias corrected)	2.43	Data Distribution	
Theta Star	111.1	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	270.1		
MLE of Standard Deviation	173.2		
nu star	63.17	Nonparametric Statistics	
Approximate Chi Square Value (.05)	45.89	95% CLT UCL	348.9
Adjusted Level of Significance	0.0301	95% Jackknife UCL	355.4
Adjusted Chi Square Value	43.8	95% Standard Bootstrap UCL	347.2
		95% Bootstrap-t UCL	395.1
Anderson-Darling Test Statistic	0.43	95% Hall's Bootstrap UCL	365.9
Anderson-Darling 5% Critical Value	0.739	95% Percentile Bootstrap UCL	349.4
Kolmogorov-Smirnov Test Statistic	0.198	95% BCA Bootstrap UCL	363.3
Kolmogorov-Smirnov 5% Critical Value	0.238	95% Chebyshev(Mean, Sd) UCL	478.9
Data appear Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	569.3
		99% Chebyshev(Mean, Sd) UCL	746.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	371.8
95% Adjusted Gamma UCL	389.5

Potential UCL to Use

Use 95% Approximate Gamma UCL	371.8
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-05.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	9.7	Log-transformed Statistics	
Maximum	16.35	Minimum of Log Data	2.272
Mean	11.97	Maximum of Log Data	2.794
Median	11	Mean of log Data	2.47
SD	2.132	SD of log Data	0.163
Coefficient of Variation	0.178		
Skewness	1.551		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.735	Shapiro Wilk Test Statistic	0.774
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.08	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	13.09
95% Adjusted-CLT UCL (Chen-1995)	13.28	95% Chebyshev (MVUE) UCL	14.42
95% Modified-t UCL (Johnson-1978)	13.12	97.5% Chebyshev (MVUE) UCL	15.48
		99% Chebyshev (MVUE) UCL	17.57

Gamma Distribution Test

k star (bias corrected)	29.3	Data Distribution	
Theta Star	0.409	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.97		
MLE of Standard Deviation	2.212		
nu star	703.1		
Approximate Chi Square Value (.05)	642.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	12.99
Adjusted Chi Square Value	633.7	95% Jackknife UCL	13.08

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.451	95% Standard Bootstrap UCL	12.93
Anderson-Darling 5% Critical Value	0.73	95% Bootstrap-t UCL	14.44
Kolmogorov-Smimov Test Statistic	0.347	95% Hall's Bootstrap UCL	18.85
Kolmogorov-Smimov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	13
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	13.3
		95% Chebyshev(Mean, Sd) UCL	14.66
		97.5% Chebyshev(Mean, Sd) UCL	15.82
		99% Chebyshev(Mean, Sd) UCL	18.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.1
95% Adjusted Gamma UCL	13.28

Potential UCL to Use

	Use 95% Student's-t UCL	13.08
	or 95% Modified-t UCL	13.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Cadmium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	6
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Raw Statistics

Minimum	35.55	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.571
Mean	69.43	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.191
SD	20.75	SD of log Data	0.346
Coefficient of Variation	0.299		
Skewness	-0.74		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.721	Shapiro Wilk Test Statistic	0.729
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	80.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	86.12
95% Adjusted-CLT UCL (Chen-1995)	77.92	95% Chebyshev (MVUE) UCL	100.5
95% Modified-t UCL (Johnson-1978)	79.98	97.5% Chebyshev (MVUE) UCL	113.8
		99% Chebyshev (MVUE) UCL	139.9

Gamma Distribution Test

k star (bias corrected)	7.701	Data Distribution	
Theta Star	9.016	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	69.43		
MLE of Standard Deviation	25.02		
nu star	184.8		
Approximate Chi Square Value (.05)	154.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	79.29
Adjusted Chi Square Value	150.1	95% Jackknife UCL	80.19
		95% Standard Bootstrap UCL	78.87
		95% Bootstrap-t UCL	79.36
		95% Hall's Bootstrap UCL	77.49
		95% Percentile Bootstrap UCL	78.28
		95% BCA Bootstrap UCL	77.36
		95% Chebyshev(Mean, Sd) UCL	95.55
		97.5% Chebyshev(Mean, Sd) UCL	106.8
		99% Chebyshev(Mean, Sd) UCL	129

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.651		
Anderson-Darling 5% Critical Value	0.73		
Kolmogorov-Smirnov Test Statistic	0.363		
Kolmogorov-Smirnov 5% Critical Value	0.245		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	83.13		
95% Adjusted Gamma UCL	85.48		

Potential UCL to Use

Use 95% Student's-t UCL	80.19
or 95% Modified-t UCL	79.98

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Cobalt was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	28.24	Log-transformed Statistics	
Maximum	218.2	Minimum of Log Data	3.341
Mean	93.8	Maximum of Log Data	5.385
Median	88.03	Mean of log Data	4.356
SD	60.2	SD of log Data	0.644
Coefficient of Variation	0.642		
Skewness	1.154		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	125	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	150.9
95% Adjusted-CLT UCL (Chen-1995)	128.6	95% Chebyshev (MVUE) UCL	173.1
95% Modified-t UCL (Johnson-1978)	126	97.5% Chebyshev (MVUE) UCL	207.2
		99% Chebyshev (MVUE) UCL	274.4

Gamma Distribution Test

k star (bias corrected)	2.2	Data appear Gamma Distributed at 5% Significance Level
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Theta Star	42.63
MLE of Mean	93.8
MLE of Standard Deviation	63.23
nu star	52.81
Approximate Chi Square Value (.05)	37.11
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	35.11

Anderson-Darling Test Statistic	0.373
Anderson-Darling 5% Critical Value	0.739
Kolmogorov-Smirnov Test Statistic	0.174
Kolmogorov-Smirnov 5% Critical Value	0.248
Data appear Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	133.5
95% Adjusted Gamma UCL	141.1

Potential UCL to Use

Use 95% Approximate Gamma UCL	133.5
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	8044	Log-transformed Statistics	
Maximum	66573	Minimum of Log Data	8.993
Mean	30422	Maximum of Log Data	11.11
Median	27396	Mean of log Data	10.17
SD	16924	SD of log Data	0.595
Coefficient of Variation	0.556		
Skewness	0.933		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	39196	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	46945
95% Adjusted-CLT UCL (Chen-1995)	39864	95% Chebyshev (MVUE) UCL	54515
95% Modified-t UCL (Johnson-1978)	39415	97.5% Chebyshev (MVUE) UCL	64802
		99% Chebyshev (MVUE) UCL	85009

Gamma Distribution Test

k star (bias corrected)	2.672	Data Distribution	
Theta Star	11385	Data appear Normal at 5% Significance Level	
MLE of Mean	30422		
MLE of Standard Deviation	18611		
nu star	64.13		
Approximate Chi Square Value (.05)	46.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	38458
Adjusted Chi Square Value	44.44	95% Jackknife UCL	39196

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.16	95% Standard Bootstrap UCL	38312
Anderson-Darling 5% Critical Value	0.737	95% Bootstrap-t UCL	42182
Kolmogorov-Smirnov Test Statistic	0.127	95% Hall's Bootstrap UCL	45843
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	38763
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	39416

Assuming Gamma Distribution

95% Approximate Gamma UCL	41771	95% Chebyshev(Mean, Sd) UCL	51717
95% Adjusted Gamma UCL	43897	97.5% Chebyshev(Mean, Sd) UCL	60932
		99% Chebyshev(Mean, Sd) UCL	79032

Potential UCL to Use

Use 95% Student's-t UCL 39196

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	105.1	Log-transformed Statistics	
Maximum	1545	Minimum of Log Data	4.655
Mean	633.3	Maximum of Log Data	7.343
Median	560.3	Mean of log Data	6.278
SD	374.7	SD of log Data	0.664
Coefficient of Variation	0.592		
Skewness	1.328		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.914
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	827.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1066
95% Adjusted-CLT UCL (Chen-1995)	855.5	95% Chebyshev (MVUE) UCL	1214
95% Modified-t UCL (Johnson-1978)	834.5	97.5% Chebyshev (MVUE) UCL	1458
		99% Chebyshev (MVUE) UCL	1938

Gamma Distribution Test

k star (bias corrected)	2.346	Data Distribution	
Theta Star	269.9	Data appear Normal at 5% Significance Level	
MLE of Mean	633.3		
MLE of Standard Deviation	413.5		
nu star	56.31		
Approximate Chi Square Value (.05)	40.06	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	811.2
Adjusted Chi Square Value	37.98	95% Jackknife UCL	827.6

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.345	95% Standard Bootstrap UCL	803.7
Anderson-Darling 5% Critical Value	0.739	95% Bootstrap-t UCL	907.2
Kolmogorov-Smirnov Test Statistic	0.174	95% Hall's Bootstrap UCL	1247
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	816.3
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	842.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	890.2	95% Chebyshev(Mean, Sd) UCL	1105
95% Adjusted Gamma UCL	939	97.5% Chebyshev(Mean, Sd) UCL	1309
		99% Chebyshev(Mean, Sd) UCL	1709

Potential UCL to Use

Use 95% Student's-t UCL	827.6
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.179	Log-transformed Statistics	
Maximum	10.94	Minimum of Log Data	-1.72
Mean	9.193	Maximum of Log Data	2.392
Median	10	Mean of log Data	1.968
SD	2.863	SD of log Data	1.162
Coefficient of Variation	0.311		
Skewness	-3.357		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.421	Shapiro Wilk Test Statistic	0.35
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.68	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	43.39
95% Adjusted-CLT UCL (Chen-1995)	9.696	95% Chebyshev (MVUE) UCL	33.4
95% Modified-t UCL (Johnson-1978)	10.54	97.5% Chebyshev (MVUE) UCL	42.25
		99% Chebyshev (MVUE) UCL	59.64

Gamma Distribution Test

k star (bias corrected)	1.666	Data Distribution	
Theta Star	5.518	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.193		
MLE of Standard Deviation	7.122	Nonparametric Statistics	
nu star	39.98	95% CLT UCL	10.55
Approximate Chi Square Value (.05)	26.49	95% Jackknife UCL	10.68
Adjusted Level of Significance	0.029	95% Standard Bootstrap UCL	10.49
Adjusted Chi Square Value	24.83	95% Bootstrap-t UCL	10.25

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.915	95% Hall's Bootstrap UCL	9.994
Anderson-Darling 5% Critical Value	0.741	95% Percentile Bootstrap UCL	10.16
Kolmogorov-Smirnov Test Statistic	0.507	95% BCA Bootstrap UCL	10.08
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Chebyshev(Mean, Sd) UCL	12.8
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	14.35
		99% Chebyshev(Mean, Sd) UCL	17.42

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.87
95% Adjusted Gamma UCL	14.8

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	12.8
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	65	Log-transformed Statistics	
Maximum	697.1	Minimum of Log Data	4.174
Mean	361.5	Maximum of Log Data	6.547
Median	345.9	Mean of log Data	5.724
SD	192.5	SD of log Data	0.666
Coefficient of Variation	0.533		
Skewness	0.466		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.945	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	461.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	614.2
95% Adjusted-CLT UCL (Chen-1995)	460.9	95% Chebyshev (MVUE) UCL	699.4
95% Modified-t UCL (Johnson-1978)	462.5	97.5% Chebyshev (MVUE) UCL	840.2
		99% Chebyshev (MVUE) UCL	1117

Gamma Distribution Test

k star (bias corrected)	2.423	Data Distribution	
Theta Star	149.2	Data appear Normal at 5% Significance Level	
MLE of Mean	361.5		
MLE of Standard Deviation	232.2		
nu star	58.14		
Approximate Chi Square Value (.05)	41.61	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	452.9
Adjusted Chi Square Value	39.49	95% Jackknife UCL	461.3
		95% Standard Bootstrap UCL	449
		95% Bootstrap-t UCL	479.9

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.295	95% Hall's Bootstrap UCL	501.1
Anderson-Darling 5% Critical Value	0.739	95% Percentile Bootstrap UCL	449.7
Kolmogorov-Smirnov Test Statistic	0.149	95% BCA Bootstrap UCL	458.8
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Chebyshev(Mean, Sd) UCL	603.7
Data appear Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	708.6
		99% Chebyshev(Mean, Sd) UCL	914.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	505.1
95% Adjusted Gamma UCL	532.3

Potential UCL to Use

Use 95% Student's-t UCL 461.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1	Minimum of Log Data	0
Maximum	5	Maximum of Log Data	1.609
Mean	4.636	Mean of log Data	1.469
Median	5	SD of log Data	0.463
SD	1.15		
Coefficient of Variation	0.248		
Skewness	-3.415		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.367	Shapiro Wilk Test Statistic	0.348
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.233	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.482
95% Adjusted-CLT UCL (Chen-1995)	4.833	95% Chebyshev (MVUE) UCL	7.64
95% Modified-t UCL (Johnson-1978)	5.178	97.5% Chebyshev (MVUE) UCL	8.872
		99% Chebyshev (MVUE) UCL	11.29

Gamma Distribution Test

k star (bias corrected)	5.955	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.779		
MLE of Mean	4.636		
MLE of Standard Deviation	1.9		
nu star	142.9		
Approximate Chi Square Value (.05)	116.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.182
Adjusted Chi Square Value	112.6	95% Jackknife UCL	5.233
		95% Standard Bootstrap UCL	N/A
		95% Bootstrap-t UCL	N/A
		95% Hall's Bootstrap UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	6.083
		97.5% Chebyshev(Mean, Sd) UCL	6.709
		99% Chebyshev(Mean, Sd) UCL	7.939

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.854		
Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.464		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.698		
95% Adjusted Gamma UCL	5.883		

Potential UCL to Use

Use 95% Student's-t UCL	5.233
or 95% Modified-t UCL	5.178

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	1.2	Log-transformed Statistics	
Maximum	12.87	Minimum of Log Data	0.182
Mean	9.433	Maximum of Log Data	2.555
Median	10	Mean of log Data	2.139
SD	2.734	SD of log Data	0.621
Coefficient of Variation	0.29		
Skewness	-2.753		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.538	Shapiro Wilk Test Statistic	0.414
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.85	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.85
95% Adjusted-CLT UCL (Chen-1995)	10.06	95% Chebyshev (MVUE) UCL	18.29
95% Modified-t UCL (Johnson-1978)	10.75	97.5% Chebyshev (MVUE) UCL	21.83
		99% Chebyshev (MVUE) UCL	28.78

Gamma Distribution Test

k star (bias corrected)	3.756	Data Distribution	
Theta Star	2.511	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.433		
MLE of Standard Deviation	4.867		
nu star	90.14		
Approximate Chi Square Value (.05)	69.25	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.73
Adjusted Chi Square Value	66.46	95% Jackknife UCL	10.85
		95% Standard Bootstrap UCL	10.65

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.253	95% Bootstrap-t UCL	10.39
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	10.24
Kolmogorov-Smimov Test Statistic	0.477	95% Percentile Bootstrap UCL	10.45
Kolmogorov-Smimov 5% Critical Value	0.246	95% BCA Bootstrap UCL	10.24
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.87
		97.5% Chebyshev(Mean, Sd) UCL	14.36
		99% Chebyshev(Mean, Sd) UCL	17.29

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.28
95% Adjusted Gamma UCL	12.79

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	12.87
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Technetium-99 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Thallium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Thallium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Thorium-230

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Thorium-230 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Total PAH

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	20	Log-transformed Statistics	
Maximum	445	Minimum of Log Data	2.996
Mean	193.1	Maximum of Log Data	6.098
Median	159.9	Mean of log Data	4.987
SD	133.3	SD of log Data	0.865
Coefficient of Variation	0.69		
Skewness	0.746		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	262.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	428
95% Adjusted-CLT UCL (Chen-1995)	265.2	95% Chebyshev (MVUE) UCL	440.2
95% Modified-t UCL (Johnson-1978)	263.6	97.5% Chebyshev (MVUE) UCL	542.1
		99% Chebyshev (MVUE) UCL	742.3

Gamma Distribution Test

k star (bias corrected)	1.528	Data Distribution	
Theta Star	126.3	Data appear Normal at 5% Significance Level	
MLE of Mean	193.1		
MLE of Standard Deviation	156.2		
nu star	36.68		
Approximate Chi Square Value (.05)	23.82	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	256.4
Adjusted Chi Square Value	22.25	95% Jackknife UCL	262.2
		95% Standard Bootstrap UCL	252.7
		95% Bootstrap-t UCL	276.5
		95% Hall's Bootstrap UCL	267.8
		95% Percentile Bootstrap UCL	255.4
		95% BCA Bootstrap UCL	261.3
		95% Chebyshev(Mean, Sd) UCL	360.8
		97.5% Chebyshev(Mean, Sd) UCL	433.4
		99% Chebyshev(Mean, Sd) UCL	575.9

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.147		
Anderson-Darling 5% Critical Value	0.742		
Kolmogorov-Smirnov Test Statistic	0.086		
Kolmogorov-Smirnov 5% Critical Value	0.249		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	297.4		
95% Adjusted Gamma UCL	318.4		

Potential UCL to Use

Use 95% Student's-t UCL	262.2
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-06.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Cadmium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Cadmium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	32.91	Log-transformed Statistics	
Maximum	897.6	Minimum of Log Data	3.494
Mean	148.4	Maximum of Log Data	6.8
Median	85	Mean of log Data	4.56
SD	236.4	SD of log Data	0.756
Coefficient of Variation	1.593		
Skewness	3.438		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.365	Shapiro Wilk Test Statistic	0.521
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	270.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	225
95% Adjusted-CLT UCL (Chen-1995)	333	95% Chebyshev (MVUE) UCL	246.8
95% Modified-t UCL (Johnson-1978)	282.2	97.5% Chebyshev (MVUE) UCL	300.1
		99% Chebyshev (MVUE) UCL	404.8

Gamma Distribution Test

k star (bias corrected)	1.014	Data Distribution	
Theta Star	146.3	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	148.4		
MLE of Standard Deviation	147.3		
nu star	24.34		
Approximate Chi Square Value (.05)	14.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	260.6
Adjusted Chi Square Value	12.93	95% Jackknife UCL	270.9
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.372	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.522	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.251	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	445.9
		97.5% Chebyshev(Mean, Sd) UCL	574.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	827.4
95% Approximate Gamma UCL	256		
95% Adjusted Gamma UCL	279.3		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	445.9
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	21.45	Minimum of Log Data	3.066
Maximum	207.4	Maximum of Log Data	5.334
Mean	92.47	Mean of log Data	4.341
Median	78.97	SD of log Data	0.659
SD	57.52		
Coefficient of Variation	0.622		
Skewness	0.932		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.972
Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	122.3	95% H-UCL	152.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	173.9
95% Adjusted-CLT UCL (Chen-1995)	124.6	97.5% Chebyshev (MVUE) UCL	208.7
95% Modified-t UCL (Johnson-1978)	123	99% Chebyshev (MVUE) UCL	277
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.194	Data appear Normal at 5% Significance Level	
Theta Star	42.15		
MLE of Mean	92.47		
MLE of Standard Deviation	62.43		
nu star	52.64		
Approximate Chi Square Value (.05)	36.98	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	119.8
Adjusted Chi Square Value	34.98	95% Jackknife UCL	122.3
		95% Standard Bootstrap UCL	118.8
Anderson-Darling Test Statistic	0.218	95% Bootstrap-t UCL	130.3
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	129
Kolmogorov-Smirnov Test Statistic	0.13	95% Percentile Bootstrap UCL	120.3
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	122
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	164.8
		97.5% Chebyshev(Mean, Sd) UCL	196.2
		99% Chebyshev(Mean, Sd) UCL	257.7
Assuming Gamma Distribution			
95% Approximate Gamma UCL	131.6		
95% Adjusted Gamma UCL	139.2		
Potential UCL to Use		Use 95% Student's-t UCL	122.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.347	Minimum of Log Data	-1.058
Maximum	10	Maximum of Log Data	2.303
Mean	9.196	Mean of log Data	2.023
Median	10	SD of log Data	0.97
SD	2.787		
Coefficient of Variation	0.303		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10.64	95% H-UCL	27.95
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	26.43
95% Adjusted-CLT UCL (Chen-1995)	9.659	97.5% Chebyshev (MVUE) UCL	32.9
95% Modified-t UCL (Johnson-1978)	10.51	99% Chebyshev (MVUE) UCL	45.61
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.083	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.415		
MLE of Mean	9.196		
MLE of Standard Deviation	6.371		
nu star	49.99		
Approximate Chi Square Value (.05)	34.76	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.52
Adjusted Chi Square Value	32.83	95% Jackknife UCL	N/A
Anderson-Darling Test Statistic	4.207	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.74	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.551	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL	12.7
95% Approximate Gamma UCL	13.23	97.5% Chebyshev(Mean, Sd) UCL	14.22
95% Adjusted Gamma UCL	14	99% Chebyshev(Mean, Sd) UCL	17.2
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	12.7
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	175.8	Log-transformed Statistics	
Maximum	1623	Minimum of Log Data	5.17
Mean	730.6	Maximum of Log Data	7.392
Median	653.8	Mean of log Data	6.393
SD	448.9	SD of log Data	0.696
Coefficient of Variation	0.614		
Skewness	0.582		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.937	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	963.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1261
95% Adjusted-CLT UCL (Chen-1995)	967	95% Chebyshev (MVUE) UCL	1421
95% Modified-t UCL (Johnson-1978)	967	97.5% Chebyshev (MVUE) UCL	1714
		99% Chebyshev (MVUE) UCL	2290

Gamma Distribution Test

k star (bias corrected)	2.04	Data Distribution	
Theta Star	358.1	Data appear Normal at 5% Significance Level	
MLE of Mean	730.6		
MLE of Standard Deviation	511.5		
nu star	48.97		
Approximate Chi Square Value (.05)	33.9	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	943.8
Adjusted Chi Square Value	32	95% Jackknife UCL	963.3
		95% Standard Bootstrap UCL	931.8

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.273	95% Bootstrap-t UCL	985.7
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	986.5
Kolmogorov-Smirnov Test Statistic	0.141	95% Percentile Bootstrap UCL	928
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	959.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1295
		97.5% Chebyshev(Mean, Sd) UCL	1540
		99% Chebyshev(Mean, Sd) UCL	2020

Assuming Gamma Distribution

95% Approximate Gamma UCL	1055		
95% Adjusted Gamma UCL	1118		

Potential UCL to Use

Use 95% Student's-t UCL	963.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.67	Minimum of Log Data	-0.4
Maximum	5	Maximum of Log Data	1.609
Mean	4.639	Mean of log Data	1.442
Median	5	SD of log Data	0.58
SD	1.25		
Coefficient of Variation	0.269		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.287	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	7.41
95% Adjusted-CLT UCL (Chen-1995)	4.847	95% Chebyshev (MVUE) UCL	8.632
95% Modified-t UCL (Johnson-1978)	5.227	97.5% Chebyshev (MVUE) UCL	10.24
		99% Chebyshev (MVUE) UCL	13.39

Gamma Distribution Test

k star (bias corrected)	4.227	Data Distribution	
Theta Star	1.098	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.639		
MLE of Standard Deviation	2.257		
nu star	101.4		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.029	Nonparametric Statistics	
Adjusted Chi Square Value	76.21	95% CLT UCL	5.233
		95% Jackknife UCL	N/A

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	4.134	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.542	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	6.212
		97.5% Chebyshev(Mean, Sd) UCL	6.893
		99% Chebyshev(Mean, Sd) UCL	8.229

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.942
95% Adjusted Gamma UCL	6.175

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	6.212
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	10	Minimum of Log Data	2.303
Maximum	16.63	Maximum of Log Data	2.811
Mean	10.82	Mean of log Data	2.368
Median	10	SD of log Data	0.161
SD	2.047		
Coefficient of Variation	0.189		
Skewness	2.596		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.477	Shapiro Wilk Test Statistic	0.484
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	11.88	95% H-UCL	11.81
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.99
95% Adjusted-CLT UCL (Chen-1995)	12.26	97.5% Chebyshev (MVUE) UCL	13.94
95% Modified-t UCL (Johnson-1978)	11.95	99% Chebyshev (MVUE) UCL	15.8

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	28.59	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.378		
MLE of Mean	10.82		
MLE of Standard Deviation	2.023		
nu star	686.2		
Approximate Chi Square Value (.05)	626.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.79
Adjusted Chi Square Value	617.7	95% Jackknife UCL	11.88

Anderson-Darling Test Statistic		95% Standard Bootstrap UCL		N/A
Anderson-Darling 5% Critical Value		95% Bootstrap-t UCL		N/A
Kolmogorov-Smirnov Test Statistic		95% Hall's Bootstrap UCL		N/A
Kolmogorov-Smirnov 5% Critical Value		95% Percentile Bootstrap UCL		N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL		N/A
		95% Chebyshev(Mean, Sd) UCL		13.39
		97.5% Chebyshev(Mean, Sd) UCL		14.51
		99% Chebyshev(Mean, Sd) UCL		16.7
Assuming Gamma Distribution				
95% Approximate Gamma UCL	11.85			
95% Adjusted Gamma UCL	12.02			

Potential UCL to Use		Use 95% Student's-t UCL	11.88
		or 95% Modified-t UCL	11.95

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	146.4	Minimum of Log Data	4.986
Maximum	864.7	Maximum of Log Data	6.762
Mean	407.7	Mean of log Data	5.828
Median	320	SD of log Data	0.63
SD	260.2		
Coefficient of Variation	0.638		
Skewness	0.895		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Test Statistic	0.857	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	542.6	95% H-UCL	642.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	740.1
95% Adjusted-CLT UCL (Chen-1995)	552	97.5% Chebyshev (MVUE) UCL	884.5
95% Modified-t UCL (Johnson-1978)	545.8	99% Chebyshev (MVUE) UCL	1168
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.228	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	183		
MLE of Mean	407.7		
MLE of Standard Deviation	273.1		
nu star	53.47		
Approximate Chi Square Value (.05)	37.67	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	531.3
Adjusted Chi Square Value	35.66	95% Jackknife UCL	542.6
		95% Standard Bootstrap UCL	525.7
Anderson-Darling Test Statistic	0.408	95% Bootstrap-t UCL	589.8
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	545.8
Kolmogorov-Smirnov Test Statistic	0.136	95% Percentile Bootstrap UCL	523.6
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	550.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	735.1
		97.5% Chebyshev(Mean, Sd) UCL	876.8
		99% Chebyshev(Mean, Sd) UCL	1155
Assuming Gamma Distribution			
95% Approximate Gamma UCL	578.7		
95% Adjusted Gamma UCL	611.4		
Potential UCL to Use		Use 95% Approximate Gamma UCL	578.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options		
From File		14-07.wst
Full Precision		OFF
Confidence Coefficient		95%
Number of Bootstrap Operations		2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	9.28	Log-transformed Statistics	
Maximum	12.99	Minimum of Log Data	2.228
Mean	10.83	Maximum of Log Data	2.564
Median	11	Mean of log Data	2.379
SD	0.926	SD of log Data	0.0847
Coefficient of Variation	0.0855		
Skewness	0.582		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.786	Shapiro Wilk Test Statistic	0.797
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	11.31	95% Chebyshev (MVUE) UCL	11.98
95% Modified-t UCL (Johnson-1978)	11.31	97.5% Chebyshev (MVUE) UCL	12.48
		99% Chebyshev (MVUE) UCL	13.46

Gamma Distribution Test

k star (bias corrected)	113.7	Data Distribution	
Theta Star	0.0952	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	10.83		
MLE of Standard Deviation	1.015		
nu star	2730		
Approximate Chi Square Value (.05)	2609	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.26
Adjusted Chi Square Value	2591	95% Jackknife UCL	11.3

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.427	95% Standard Bootstrap UCL	11.24
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	11.33
Kolmogorov-Smirnov Test Statistic	0.339	95% Hall's Bootstrap UCL	11.49
Kolmogorov-Smirnov 5% Critical Value	0.245	95% Percentile Bootstrap UCL	11.25
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	11.27
		95% Chebyshev(Mean, Sd) UCL	11.99
		97.5% Chebyshev(Mean, Sd) UCL	12.49
		99% Chebyshev(Mean, Sd) UCL	13.48

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.32		
95% Adjusted Gamma UCL	11.4		

Potential UCL to Use

		Use 95% Student's-t UCL	11.3
		or 95% Modified-t UCL	11.31

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cadmium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
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Raw Statistics

Minimum	18.1	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.896
Mean	60.56	Maximum of Log Data	4.443
Median	74.78	Mean of log Data	3.979
SD	27.58	SD of log Data	0.558
Coefficient of Variation	0.455		
Skewness	-0.372		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.773	Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	74.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	90.73
95% Adjusted-CLT UCL (Chen-1995)	72.75	95% Chebyshev (MVUE) UCL	106.1
95% Modified-t UCL (Johnson-1978)	74.72	97.5% Chebyshev (MVUE) UCL	125.4
		99% Chebyshev (MVUE) UCL	163.2

Gamma Distribution Test

k star (bias corrected)	3.184	Data Distribution	
Theta Star	19.02	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	60.56		
MLE of Standard Deviation	33.94		
nu star	76.41		
Approximate Chi Square Value (.05)	57.28	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	73.66
Adjusted Chi Square Value	54.76	95% Jackknife UCL	74.86

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.22	95% Standard Bootstrap UCL	72.55
Anderson-Darling 5% Critical Value	0.735	95% Bootstrap-t UCL	74.64
Kolmogorov-Smirnov Test Statistic	0.314	95% Hall's Bootstrap UCL	71.16
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	73.71
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	72.36
		95% Chebyshev(Mean, Sd) UCL	95.27
		97.5% Chebyshev(Mean, Sd) UCL	110.3
		99% Chebyshev(Mean, Sd) UCL	139.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	80.8
95% Adjusted Gamma UCL	84.52

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	95.27
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.422	Minimum of Log Data	-0.863
Maximum	10	Maximum of Log Data	2.303
Mean	9.02	Mean of log Data	2.018
Median	10	SD of log Data	0.91
SD	2.779		
Coefficient of Variation	0.308		
Skewness	-3.191		

Warning: There are only 3 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.419	Shapiro Wilk Test Statistic	0.362
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.46	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	24.25
95% Adjusted-CLT UCL (Chen-1995)	9.55	95% Chebyshev (MVUE) UCL	24.12
95% Modified-t UCL (Johnson-1978)	10.34	97.5% Chebyshev (MVUE) UCL	29.85
		99% Chebyshev (MVUE) UCL	41.1

Gamma Distribution Test

k star (bias corrected)	2.243	Data Distribution	
Theta Star	4.022	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.02		
MLE of Standard Deviation	6.023		
nu star	53.82		
Approximate Chi Square Value (.05)	37.97	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.34
Adjusted Chi Square Value	35.94	95% Jackknife UCL	10.46
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.725	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.479	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.52
		97.5% Chebyshev(Mean, Sd) UCL	14.03
		99% Chebyshev(Mean, Sd) UCL	17

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.79
95% Adjusted Gamma UCL	13.51

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	12.52
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	84.54	Minimum of Log Data	4.437
Maximum	2668	Maximum of Log Data	7.889
Mean	670.3	Mean of log Data	5.972
Median	325.6	SD of log Data	1.055
SD	799.7		
Coefficient of Variation	1.193		
Skewness	1.919		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.723	Shapiro Wilk Critical Value	0.966
Shapiro Wilk Critical Value	0.859		0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1085	95% H-UCL	1785
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1556
95% Adjusted-CLT UCL (Chen-1995)	1187	97.5% Chebyshev (MVUE) UCL	1951
95% Modified-t UCL (Johnson-1978)	1106	99% Chebyshev (MVUE) UCL	2728
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.858	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	781.7		
MLE of Mean	670.3		
MLE of Standard Deviation	723.9		
nu star	20.58		
Approximate Chi Square Value (.05)	11.28	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1050
Adjusted Chi Square Value	10.24	95% Jackknife UCL	1085
		95% Standard Bootstrap UCL	1038
Anderson-Darling Test Statistic	0.501	95% Bootstrap-t UCL	1770
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	2990
Kolmogorov-Smirnov Test Statistic	0.179	95% Percentile Bootstrap UCL	1058
Kolmogorov-Smirnov 5% Critical Value	0.252	95% BCA Bootstrap UCL	1171
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1677
		97.5% Chebyshev(Mean, Sd) UCL	2112
		99% Chebyshev(Mean, Sd) UCL	2967
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1223		
95% Adjusted Gamma UCL	1347		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1223

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.44	Minimum of Log Data	-0.821
Maximum	10	Maximum of Log Data	2.303
Mean	5.037	Mean of log Data	1.465
Median	5	SD of log Data	0.747
SD	2.04		
Coefficient of Variation	0.405		
Skewness	0.323		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.598	Shapiro Wilk Test Statistic	0.477
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.094
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	6.064
95% Modified-t UCL (Johnson-1978)	6.103

Assuming Lognormal Distribution

95% H-UCL	10.01
95% Chebyshev (MVUE) UCL	11.03
97.5% Chebyshev (MVUE) UCL	13.39
99% Chebyshev (MVUE) UCL	18.04

Gamma Distribution Test

k star (bias corrected)	2.64
Theta Star	1.908
MLE of Mean	5.037
MLE of Standard Deviation	3.1
nu star	63.35
Approximate Chi Square Value (.05)	46.04
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	43.8

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	6.005
95% Jackknife UCL	6.094
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	7.604
97.5% Chebyshev(Mean, Sd) UCL	8.714
99% Chebyshev(Mean, Sd) UCL	10.9

Anderson-Darling Test Statistic	2.955
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.483
Kolmogorov-Smirnov 5% Critical Value	0.247
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.93
95% Adjusted Gamma UCL	7.285

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 7.604

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	48.47	Log-transformed Statistics	
Maximum	762.9	Minimum of Log Data	3.881
Mean	184.2	Maximum of Log Data	6.637
Median	105.7	Mean of log Data	4.865
SD	200.8	SD of log Data	0.802
Coefficient of Variation	1.09		
Skewness	2.529		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.663	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	288.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	332.9
95% Adjusted-CLT UCL (Chen-1995)	324.7	95% Chebyshev (MVUE) UCL	356.4
95% Modified-t UCL (Johnson-1978)	295.3	97.5% Chebyshev (MVUE) UCL	435.7
		99% Chebyshev (MVUE) UCL	591.7

Gamma Distribution Test

k star (bias corrected)	1.233	Data Distribution	
Theta Star	149.4	Data appear Lognormal at 5% Significance Level	
MLE of Mean	184.2		
MLE of Standard Deviation	165.9		
nu star	29.58		
Approximate Chi Square Value (.05)	18.17	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	279.5
Adjusted Chi Square Value	16.81	95% Jackknife UCL	288.3
		95% Standard Bootstrap UCL	272.1

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.783	95% Bootstrap-t UCL	434.2
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	625.8
Kolmogorov-Smirnov Test Statistic	0.291	95% Percentile Bootstrap UCL	282.9
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	329
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	436.8
		97.5% Chebyshev(Mean, Sd) UCL	546.1
		99% Chebyshev(Mean, Sd) UCL	760.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	300
95% Adjusted Gamma UCL	324.1

Potential UCL to Use

Use 95% H-UCL	332.9
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ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-08.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	6
Raw Statistics		Log-transformed Statistics	
Minimum	8.05	Minimum of Log Data	2.086
Maximum	14.02	Maximum of Log Data	2.64
Mean	10.63	Mean of log Data	2.355
Median	11	SD of log Data	0.137
SD	1.46		
Coefficient of Variation	0.137		
Skewness	0.574		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Critical Value	0.86
Shapiro Wilk Critical Value	0.859		0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	11.38	95% H-UCL	11.45
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.46
95% Adjusted-CLT UCL (Chen-1995)	11.39	97.5% Chebyshev (MVUE) UCL	13.25
95% Modified-t UCL (Johnson-1978)	11.4	99% Chebyshev (MVUE) UCL	14.81
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	44.01	Data appear Lognormal at 5% Significance Level	
Theta Star	0.241		
MLE of Mean	10.63		
MLE of Standard Deviation	1.602		
nu star	1056		
Approximate Chi Square Value (.05)	981.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	11.32
Adjusted Chi Square Value	970.8	95% Jackknife UCL	11.38
		95% Standard Bootstrap UCL	11.29
		95% Bootstrap-t UCL	11.43
		95% Hall's Bootstrap UCL	11.69
Anderson-Darling Test Statistic	1.002	95% Percentile Bootstrap UCL	11.34
Anderson-Darling 5% Critical Value	0.73	95% BCA Bootstrap UCL	11.34
Kolmogorov-Smirnov Test Statistic	0.295	95% Chebyshev(Mean, Sd) UCL	12.46
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	13.26
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	14.82
Assuming Gamma Distribution			
95% Approximate Gamma UCL	11.43		
95% Adjusted Gamma UCL	11.56		
Potential UCL to Use		Use 95% Student's-t UCL	11.38
		or 95% Modified-t UCL	11.4
		or 95% H-UCL	11.45

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics		Number of Distinct Observations	
Number of Valid Observations	12		5
Raw Statistics		Log-transformed Statistics	
Minimum	32.42	Minimum of Log Data	3.479
Maximum	85	Maximum of Log Data	4.443
Mean	69.46	Mean of log Data	4.175
Median	85	SD of log Data	0.403
SD	23.15		
Coefficient of Variation	0.333		
Skewness	-0.87		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.652	Shapiro Wilk Critical Value	0.668
Shapiro Wilk Critical Value	0.859		0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	81.46	95% H-UCL	90.23
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	106.1
95% Adjusted-CLT UCL (Chen-1995)	78.66	97.5% Chebyshev (MVUE) UCL	121.7
95% Modified-t UCL (Johnson-1978)	81.18	99% Chebyshev (MVUE) UCL	152.3
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.874	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.82		
MLE of Mean	69.46		
MLE of Standard Deviation	28.66		
nu star	141		
Approximate Chi Square Value (.05)	114.5	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	80.45
Adjusted Chi Square Value	110.9	95% Jackknife UCL	81.46
		95% Standard Bootstrap UCL	79.7
		95% Bootstrap-t UCL	80.45
		95% Hall's Bootstrap UCL	78.61
		95% Percentile Bootstrap UCL	78.51
		95% BCA Bootstrap UCL	77.72
		95% Chebyshev(Mean, Sd) UCL	98.59
		97.5% Chebyshev(Mean, Sd) UCL	111.2
		99% Chebyshev(Mean, Sd) UCL	135.9
Anderson-Darling Test Statistic	2.127		
Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.425		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data not Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution			
95% Approximate Gamma UCL	85.49		
95% Adjusted Gamma UCL	88.29		
Potential UCL to Use		Use 95% Student's-t UCL	81.46
		or 95% Modified-t UCL	81.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.0489	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.018
Mean	8.996	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.84
SD	2.881	SD of log Data	1.531
Coefficient of Variation	0.32		
Skewness	-3.225		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.414	Shapiro Wilk Test Statistic	0.347
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.49	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	126.5
95% Adjusted-CLT UCL (Chen-1995)	9.536	95% Chebyshev (MVUE) UCL	53.2
95% Modified-t UCL (Johnson-1978)	10.36	97.5% Chebyshev (MVUE) UCL	68.82
		99% Chebyshev (MVUE) UCL	99.5

Gamma Distribution Test

k star (bias corrected)	1.215	Data Distribution	
Theta Star	7.406	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.996		
MLE of Standard Deviation	8.162		
nu star	29.15		
Approximate Chi Square Value (.05)	17.83	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.36
Adjusted Chi Square Value	16.49	95% Jackknife UCL	10.49
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.99	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.49	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.62
		97.5% Chebyshev(Mean, Sd) UCL	14.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.27
95% Approximate Gamma UCL	14.71		
95% Adjusted Gamma UCL	15.91		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	17.27
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	112.5	Minimum of Log Data	4.723
Maximum	1300	Maximum of Log Data	7.17
Mean	502.6	Mean of log Data	6.033
Median	429.5	SD of log Data	0.656
SD	327.6		
Coefficient of Variation	0.652		
Skewness	1.427		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Critical Value	0.988
Shapiro Wilk Critical Value	0.859		0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	672.5	95% H-UCL	822
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	939.3
95% Adjusted-CLT UCL (Chen-1995)	699.8	97.5% Chebyshev (MVUE) UCL	1127
95% Modified-t UCL (Johnson-1978)	679	99% Chebyshev (MVUE) UCL	1495
Gamma Distribution Test		Data Distribution	
k star (bias corrected)		Data appear Normal at 5% Significance Level	
Theta Star	2.177		
MLE of Mean	230.9		
MLE of Standard Deviation	502.6		
nu star	340.7		
Approximate Chi Square Value (.05)	52.24	Nonparametric Statistics	
Adjusted Level of Significance	36.64	95% CLT UCL	658.2
Adjusted Chi Square Value	0.029	95% Jackknife UCL	672.5
	34.65	95% Standard Bootstrap UCL	651.9
		95% Bootstrap-t UCL	783.1
Anderson-Darling Test Statistic	0.169	95% Hall's Bootstrap UCL	1478
Anderson-Darling 5% Critical Value	0.739	95% Percentile Bootstrap UCL	655.2
Kolmogorov-Smirnov Test Statistic	0.134	95% BCA Bootstrap UCL	696.7
Kolmogorov-Smirnov 5% Critical Value	0.248	95% Chebyshev(Mean, Sd) UCL	914.9
Data appear Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	1093
		99% Chebyshev(Mean, Sd) UCL	1444
Assuming Gamma Distribution			
95% Approximate Gamma UCL	716.7		
95% Adjusted Gamma UCL	757.7		
Potential UCL to Use		Use 95% Student's-t UCL	672.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	5	Maximum of Log Data	1.609
Mean	4.593	Mean of log Data	1.291
Median	5	SD of log Data	1.102
SD	1.412		
Coefficient of Variation	0.307		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5.324	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	18.71
95% Adjusted-CLT UCL (Chen-1995)	4.827	95% Chebyshev (MVUE) UCL	15.48
95% Modified-t UCL (Johnson-1978)	5.256	97.5% Chebyshev (MVUE) UCL	19.5
		99% Chebyshev (MVUE) UCL	27.38

Gamma Distribution Test

k star (bias corrected)	1.779	Data Distribution	
Theta Star	2.581	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.593		
MLE of Standard Deviation	3.443		
nu star	42.7		
Approximate Chi Square Value (.05)	28.72	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	5.263
Adjusted Chi Square Value	26.98	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.235	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.554	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.369
		97.5% Chebyshev(Mean, Sd) UCL	7.137
		99% Chebyshev(Mean, Sd) UCL	8.647

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.828		
95% Adjusted Gamma UCL	7.269		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	6.369
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.062	Minimum of Log Data	-2.781
Maximum	10	Maximum of Log Data	2.303
Mean	9.141	Mean of log Data	1.876
Median	10	SD of log Data	1.466
SD	2.861		
Coefficient of Variation	0.313		
Skewness	-3.456		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.344	Shapiro Wilk Test Statistic	0.33
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.62	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	103.8
95% Adjusted-CLT UCL (Chen-1995)	9.619	95% Chebyshev (MVUE) UCL	49.54
95% Modified-t UCL (Johnson-1978)	10.49	97.5% Chebyshev (MVUE) UCL	63.87
		99% Chebyshev (MVUE) UCL	92.04

Gamma Distribution Test

k star (bias corrected)	1.279	Data Distribution	
Theta Star	7.149	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.141		
MLE of Standard Deviation	8.084		
nu star	30.69	Nonparametric Statistics	
Approximate Chi Square Value (.05)	19.03	95% CLT UCL	10.5
Adjusted Level of Significance	0.029	95% Jackknife UCL	10.62
Adjusted Chi Square Value	17.64	95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.257	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.546	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.74
Assuming Gamma Distribution		97.5% Chebyshev(Mean, Sd) UCL	14.3
95% Approximate Gamma UCL	14.74	99% Chebyshev(Mean, Sd) UCL	17.36
95% Adjusted Gamma UCL	15.9		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	12.74
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	8.8	Log-transformed Statistics	
Maximum	638.1	Minimum of Log Data	2.175
Mean	166	Maximum of Log Data	6.459
Median	59.43	Mean of log Data	4.375
SD	200	SD of log Data	1.333
Coefficient of Variation	1.204		
Skewness	1.497		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	269.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	806
95% Adjusted-CLT UCL (Chen-1995)	287.6	95% Chebyshev (MVUE) UCL	485.4
95% Modified-t UCL (Johnson-1978)	273.9	97.5% Chebyshev (MVUE) UCL	621.1
		99% Chebyshev (MVUE) UCL	887.9

Gamma Distribution Test

k star (bias corrected)	0.659	Data Distribution	
Theta Star	252	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	166		
MLE of Standard Deviation	204.5		
nu star	15.82		
Approximate Chi Square Value (.05)	7.832	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	261
Adjusted Chi Square Value	6.991	95% Jackknife UCL	269.7
		95% Standard Bootstrap UCL	257.1
		95% Bootstrap-t UCL	334.9
		95% Hall's Bootstrap UCL	270.1
		95% Percentile Bootstrap UCL	266.7
		95% BCA Bootstrap UCL	281.3
		95% Chebyshev(Mean, Sd) UCL	417.7
		97.5% Chebyshev(Mean, Sd) UCL	526.6
		99% Chebyshev(Mean, Sd) UCL	740.5

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.48		
Anderson-Darling 5% Critical Value	0.764		
Kolmogorov-Smirnov Test Statistic	0.212		
Kolmogorov-Smirnov 5% Critical Value	0.254		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	335.3		
95% Adjusted Gamma UCL	375.6		

Potential UCL to Use

Use 95% Approximate Gamma UCL	335.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-09.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
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Raw Statistics

Minimum	5.85	Log-transformed Statistics	
Maximum	23.57	Minimum of Log Data	1.766
Mean	11.49	Maximum of Log Data	3.16
Median	11	Mean of log Data	2.38
SD	4.569	SD of log Data	0.356
Coefficient of Variation	0.398		
Skewness	1.741		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.828	Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	13.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	14.24
95% Adjusted-CLT UCL (Chen-1995)	14.37	95% Chebyshev (MVUE) UCL	16.65
95% Modified-t UCL (Johnson-1978)	13.97	97.5% Chebyshev (MVUE) UCL	18.89
		99% Chebyshev (MVUE) UCL	23.31

Gamma Distribution Test

k star (bias corrected)	6.295	Data Distribution	
Theta Star	1.826	6.295	ata Follow Appr. Gamma Distribution at 5% Significance Level
MLE of Mean	11.49		
MLE of Standard Deviation	4.581		
nu star	151.1		
Approximate Chi Square Value (.05)	123.7	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	13.66
Adjusted Chi Square Value	119.9	95% Jackknife UCL	13.86

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.546	95% Standard Bootstrap UCL	13.55
Anderson-Darling 5% Critical Value	0.731	95% Bootstrap-t UCL	15.2
Kolmogorov-Smirnov Test Statistic	0.254	95% Hall's Bootstrap UCL	24.65
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Percentile Bootstrap UCL	13.76
Data follow Appr. Gamma Distribution at 5% Significance Level		95% BCA Bootstrap UCL	14.58
		95% Chebyshev(Mean, Sd) UCL	17.24
		97.5% Chebyshev(Mean, Sd) UCL	19.73
		99% Chebyshev(Mean, Sd) UCL	24.62

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.04
95% Adjusted Gamma UCL	14.48

Potential UCL to Use

Use 95% Approximate Gamma UCL	14.04
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Cadmium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Cesium-137

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.19	Minimum of Log Data	-1.661
Maximum	0.62	Maximum of Log Data	-0.478
Mean	0.405	Mean of log Data	-0.931
Median	0.405	SD of log Data	0.26
SD	0.0917		
Coefficient of Variation	0.226		
Skewness	-3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.563
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.453	95% H-UCL	0.473
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.54
95% Adjusted-CLT UCL (Chen-1995)	0.449	97.5% Chebyshev (MVUE) UCL	0.598
95% Modified-t UCL (Johnson-1978)	0.453	99% Chebyshev (MVUE) UCL	0.712
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	13.77	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0294		
MLE of Mean	0.405	Nonparametric Statistics	
MLE of Standard Deviation	0.109	95% CLT UCL	0.449
nu star	330.6	95% Jackknife UCL	0.453
Approximate Chi Square Value (.05)	289.4	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	283.6	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.765	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.448	95% Chebyshev(Mean, Sd) UCL	0.52
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	0.57
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	0.668
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.463		
95% Adjusted Gamma UCL	0.472		
Potential UCL to Use		Use 95% Student's-t UCL	0.453
		or 95% Modified-t UCL	0.453

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	26.3	Minimum of Log Data	3.27
Maximum	85	Maximum of Log Data	4.443
Mean	60.19	Mean of log Data	3.997
Median	65.72	SD of log Data	0.483
SD	26.31		
Coefficient of Variation	0.437		
Skewness	-0.0986		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.741	Shapiro Wilk Test Statistic	0.779
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	73.83	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	83.28
95% Adjusted-CLT UCL (Chen-1995)	72.45	95% Chebyshev (MVUE) UCL	98.11
95% Modified-t UCL (Johnson-1978)	73.79	97.5% Chebyshev (MVUE) UCL	114.4
		99% Chebyshev (MVUE) UCL	146.3

Gamma Distribution Test

k star (bias corrected)	3.903	Data Distribution	
Theta Star	15.42	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	60.19		
MLE of Standard Deviation	30.47		
nu star	93.66	Nonparametric Statistics	
Approximate Chi Square Value (.05)	72.34	95% CLT UCL	72.68
Adjusted Level of Significance	0.029	95% Jackknife UCL	73.83
Adjusted Chi Square Value	69.49	95% Standard Bootstrap UCL	71.96
		95% Bootstrap-t UCL	74.29
Anderson-Darling Test Statistic	1.386	95% Hall's Bootstrap UCL	70.71
Anderson-Darling 5% Critical Value	0.732	95% Percentile Bootstrap UCL	72.29
Kolmogorov-Smirnov Test Statistic	0.335	95% BCA Bootstrap UCL	72.15
Kolmogorov-Smirnov 5% Critical Value	0.246	95% Chebyshev(Mean, Sd) UCL	93.3
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	107.6
		99% Chebyshev(Mean, Sd) UCL	135.8
Assuming Gamma Distribution			
95% Approximate Gamma UCL	77.93		
95% Adjusted Gamma UCL	81.13		

Potential UCL to Use

Use 95% Student's-t UCL	73.83
or 95% Modified-t UCL	73.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	1.13	Minimum of Log Data	0.122
Maximum	10	Maximum of Log Data	2.303
Mean	9.261	Mean of log Data	2.121
Median	10	SD of log Data	0.629
SD	2.561		
Coefficient of Variation	0.276		
Skewness	-3.464		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.327	Shapiro Wilk Test Statistic	0.327
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.59	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.76
95% Adjusted-CLT UCL (Chen-1995)	9.687	95% Chebyshev (MVUE) UCL	18.15
95% Modified-t UCL (Johnson-1978)	10.47	97.5% Chebyshev (MVUE) UCL	21.69
		99% Chebyshev (MVUE) UCL	28.64

Gamma Distribution Test

k star (bias corrected)	3.751	Data Distribution	
Theta Star	2.469	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.261		
MLE of Standard Deviation	4.782		
nu star	90.01		
Approximate Chi Square Value (.05)	69.14	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.48
Adjusted Chi Square Value	66.35	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	4.142	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.543	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.48
		97.5% Chebyshev(Mean, Sd) UCL	13.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.62
95% Approximate Gamma UCL	12.06		
95% Adjusted Gamma UCL	12.56		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	12.48
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	2.99	Minimum of Log Data	1.095
Maximum	16	Maximum of Log Data	2.773
Mean	9.495	Mean of log Data	2.198
Median	9.495	SD of log Data	0.378
SD	2.774		
Coefficient of Variation	0.292		
Skewness	-3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.536
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.93	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.16
95% Adjusted-CLT UCL (Chen-1995)	10.81	95% Chebyshev (MVUE) UCL	14.26
95% Modified-t UCL (Johnson-1978)	10.93	97.5% Chebyshev (MVUE) UCL	16.26
		99% Chebyshev (MVUE) UCL	20.21

Gamma Distribution Test

k star (bias corrected)	7.28	Data Distribution	
Theta Star	1.304	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.495		
MLE of Standard Deviation	3.519		
nu star	174.7		
Approximate Chi Square Value (.05)	145.1	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	10.81
Adjusted Chi Square Value	141	95% Jackknife UCL	10.93
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.813	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.46	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.99
		97.5% Chebyshev(Mean, Sd) UCL	14.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.46
95% Approximate Gamma UCL	11.43		
95% Adjusted Gamma UCL	11.76		

Potential UCL to Use

Use 95% Student's-t UCL	10.93
or 95% Modified-t UCL	10.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	147.3	Minimum of Log Data	4.993
Maximum	1725	Maximum of Log Data	7.453
Mean	538.1	Mean of log Data	5.992
Median	327.7	SD of log Data	0.757
SD	495.5		
Coefficient of Variation	0.921		
Skewness	1.792		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.733	Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	795	95% H-UCL	943.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1034
95% Adjusted-CLT UCL (Chen-1995)	852.5	97.5% Chebyshev (MVUE) UCL	1258
95% Modified-t UCL (Johnson-1978)	807.3	99% Chebyshev (MVUE) UCL	1697

Gamma Distribution Test

k star (bias corrected)	1.434	Data Distribution	
Theta Star	375.2	Data appear Lognormal at 5% Significance Level	
MLE of Mean	538.1		
MLE of Standard Deviation	449.3		
nu star	34.42		
Approximate Chi Square Value (.05)	22	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	773.4
Adjusted Chi Square Value	20.5	95% Jackknife UCL	795

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.784	95% Standard Bootstrap UCL	768.4
Anderson-Darling 5% Critical Value	0.743	95% Bootstrap-t UCL	1209
Kolmogorov-Smirnov Test Statistic	0.295	95% Hall's Bootstrap UCL	1934
Kolmogorov-Smirnov 5% Critical Value	0.249	95% Percentile Bootstrap UCL	786.2
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	844.5
		95% Chebyshev(Mean, Sd) UCL	1162
		97.5% Chebyshev(Mean, Sd) UCL	1431
		99% Chebyshev(Mean, Sd) UCL	1961

Assuming Gamma Distribution

95% Approximate Gamma UCL	841.9		
95% Adjusted Gamma UCL	903.7		

Potential UCL to Use

Use 95% H-UCL 943.4

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	2
Raw Statistics		Log-transformed Statistics	
Minimum	5	Minimum of Log Data	1.609
Maximum	10	Maximum of Log Data	2.303
Mean	5.833	Mean of log Data	1.725
Median	5	SD of log Data	0.27
SD	1.946		
Coefficient of Variation	0.334		
Skewness	2.055		

Warning: There are only 2 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.465	Shapiro Wilk Test Statistic	0.465
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.842	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.793
95% Adjusted-CLT UCL (Chen-1995)	7.114	95% Chebyshev (MVUE) UCL	7.787
95% Modified-t UCL (Johnson-1978)	6.898	97.5% Chebyshev (MVUE) UCL	8.645
		99% Chebyshev (MVUE) UCL	10.33

Gamma Distribution Test

k star (bias corrected)	9.887	Data Distribution	
Theta Star	0.59	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.833		
MLE of Standard Deviation	1.855		
nu star	237.3		
Approximate Chi Square Value (.05)	202.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	6.757
Adjusted Chi Square Value	197.7	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.442	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.507	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.282
		97.5% Chebyshev(Mean, Sd) UCL	9.342
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.42
95% Approximate Gamma UCL	6.831		
95% Adjusted Gamma UCL	7		

Potential UCL to Use

Use 95% Student's-t UCL	6.842
or 95% Modified-t UCL	6.898

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Technetium-99

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	166	Minimum of Log Data	5.112
Maximum	215	Maximum of Log Data	5.371
Mean	190.5	Mean of log Data	5.248
Median	190.5	SD of log Data	0.0552
SD	10.45		
Coefficient of Variation	0.0548		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.597
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	195.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	195.5	95% Chebyshev (MVUE) UCL	203.7
95% Modified-t UCL (Johnson-1978)	195.9	97.5% Chebyshev (MVUE) UCL	209.5
		99% Chebyshev (MVUE) UCL	220.7

Gamma Distribution Test

k star (bias corrected)	270	Data Distribution	
Theta Star	0.706	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	190.5		
MLE of Standard Deviation	11.59		
nu star	6480		
Approximate Chi Square Value (.05)	6294	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	195.5
Adjusted Chi Square Value	6266	95% Jackknife UCL	195.9
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.716	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.424	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	203.6
		97.5% Chebyshev(Mean, Sd) UCL	209.3
		99% Chebyshev(Mean, Sd) UCL	220.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	196.1		
95% Adjusted Gamma UCL	197		

Potential UCL to Use

Use 95% Student's-t UCL	195.9
or 95% Modified-t UCL	195.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	21.77	Log-transformed Statistics	
Maximum	4600	Minimum of Log Data	3.081
Mean	665	Maximum of Log Data	8.434
Median	275.1	Mean of log Data	5.562
SD	1266	SD of log Data	1.37
Coefficient of Variation	1.904		
Skewness	3.216		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.503	Shapiro Wilk Test Statistic	0.978
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1321	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2978
95% Adjusted-CLT UCL (Chen-1995)	1629	95% Chebyshev (MVUE) UCL	1687
95% Modified-t UCL (Johnson-1978)	1378	97.5% Chebyshev (MVUE) UCL	2164
		99% Chebyshev (MVUE) UCL	3101

Gamma Distribution Test

k star (bias corrected)	0.544	Data Distribution	
Theta Star	1223	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	665		
MLE of Standard Deviation	901.9		
nu star	13.05		
Approximate Chi Square Value (.05)	5.925	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1266
Adjusted Chi Square Value	5.21	95% Jackknife UCL	1321
		95% Standard Bootstrap UCL	1236
		95% Bootstrap-t UCL	3512
		95% Hall's Bootstrap UCL	3417
		95% Percentile Bootstrap UCL	1341
		95% BCA Bootstrap UCL	1751
		95% Chebyshev(Mean, Sd) UCL	2258
		97.5% Chebyshev(Mean, Sd) UCL	2947
		99% Chebyshev(Mean, Sd) UCL	4302

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.72		
Anderson-Darling 5% Critical Value	0.773		
Kolmogorov-Smirnov Test Statistic	0.252		
Kolmogorov-Smirnov 5% Critical Value	0.256		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	1464		
95% Adjusted Gamma UCL	1665		

Potential UCL to Use

Use 95% Approximate Gamma UCL	1464
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
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Raw Statistics

Minimum	43.2
Maximum	1070
Mean	556.6
Median	556.6
SD	218.9
Coefficient of Variation	0.393
Skewness	0

Log-transformed Statistics

Minimum of Log Data	3.766
Maximum of Log Data	6.975
Mean of log Data	6.163
SD of log Data	0.778

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.464
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	670.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	660.5
95% Modified-t UCL (Johnson-1978)	670.1

Assuming Lognormal Distribution

95% H-UCL	1165
95% Chebyshev (MVUE) UCL	1264
97.5% Chebyshev (MVUE) UCL	1541
99% Chebyshev (MVUE) UCL	2085

Gamma Distribution Test

k star (bias corrected)	2.539
Theta Star	219.2
MLE of Mean	556.6
MLE of Standard Deviation	349.3
nu star	60.93
Approximate Chi Square Value (.05)	43.98
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	41.79

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	660.5
95% Jackknife UCL	670.1
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	832.1
97.5% Chebyshev(Mean, Sd) UCL	951.3
99% Chebyshev(Mean, Sd) UCL	1185

Anderson-Darling Test Statistic	3.013
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.49
Kolmogorov-Smirnov 5% Critical Value	0.247
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	771.1
95% Adjusted Gamma UCL	811.5

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 832.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	3.32	Minimum of Log Data	1.2
Maximum	70	Maximum of Log Data	4.248
Mean	36.66	Mean of log Data	3.455
Median	36.66	SD of log Data	0.734
SD	14.22		
Coefficient of Variation	0.388		
Skewness	2.8E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.47
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	44.03	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	71.59
95% Adjusted-CLT UCL (Chen-1995)	43.41	95% Chebyshev (MVUE) UCL	79.35
95% Modified-t UCL (Johnson-1978)	44.03	97.5% Chebyshev (MVUE) UCL	96.21
		99% Chebyshev (MVUE) UCL	129.3

Gamma Distribution Test

k star (bias corrected)	2.738	Data Distribution	
Theta Star	13.39	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	36.66		
MLE of Standard Deviation	22.15		
nu star	65.72		
Approximate Chi Square Value (.05)	48.07	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	43.41
Adjusted Chi Square Value	45.77	95% Jackknife UCL	44.03

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.99	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.487	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.247	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	54.55
		97.5% Chebyshev(Mean, Sd) UCL	62.29
		99% Chebyshev(Mean, Sd) UCL	77.49

Assuming Gamma Distribution

95% Approximate Gamma UCL	50.12		
95% Adjusted Gamma UCL	52.64		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	54.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	73.5	Minimum of Log Data	4.297
Maximum	1540	Maximum of Log Data	7.34
Mean	806.8	Mean of log Data	6.547
Median	806.8	SD of log Data	0.733
SD	312.7		
Coefficient of Variation	0.388		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.47
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	968.8	95% H-UCL	1571
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1743
95% Adjusted-CLT UCL (Chen-1995)	955.2	97.5% Chebyshev (MVUE) UCL	2113
95% Modified-t UCL (Johnson-1978)	968.8	99% Chebyshev (MVUE) UCL	2840
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.747	Data do not follow a Discernable Distribution (0.05)	
Theta Star	293.7		
MLE of Mean	806.8	Nonparametric Statistics	
MLE of Standard Deviation	486.8	95% CLT UCL	955.2
nu star	65.92	95% Jackknife UCL	968.8
Approximate Chi Square Value (.05)	48.24	95% Standard Bootstrap UCL	N/A
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	N/A
Adjusted Chi Square Value	45.94	95% Hall's Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.989	95% Percentile Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.737	95% BCA Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.487	95% Chebyshev(Mean, Sd) UCL	1200
Kolmogorov-Smirnov 5% Critical Value	0.247	97.5% Chebyshev(Mean, Sd) UCL	1370
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	1705
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1102		
95% Adjusted Gamma UCL	1158		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	1200

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options	
From File	14-10.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Arsenic

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	6.2	Minimum of Log Data	1.825
Maximum	13.37	Maximum of Log Data	2.593
Mean	10.28	Mean of log Data	2.314
Median	10.82	SD of log Data	0.202
SD	1.843		
Coefficient of Variation	0.179		
Skewness	-0.95		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.83
Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	11.24	95% H-UCL	11.54
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.92
95% Adjusted-CLT UCL (Chen-1995)	11	97.5% Chebyshev (MVUE) UCL	14.06
95% Modified-t UCL (Johnson-1978)	11.22	99% Chebyshev (MVUE) UCL	16.29
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	22.06	Data appear Normal at 5% Significance Level	
Theta Star	0.466		
MLE of Mean	10.28	Nonparametric Statistics	
MLE of Standard Deviation	2.19	95% CLT UCL	11.16
nu star	529.5	95% Jackknife UCL	11.24
Approximate Chi Square Value (.05)	477.1	95% Standard Bootstrap UCL	11.13
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	11.08
Adjusted Chi Square Value	469.5	95% Hall's Bootstrap UCL	11.08
Anderson-Darling Test Statistic	0.921	95% Percentile Bootstrap UCL	11.09
Anderson-Darling 5% Critical Value	0.731	95% BCA Bootstrap UCL	11.01
Kolmogorov-Smirnov Test Statistic	0.231	95% Chebyshev(Mean, Sd) UCL	12.6
Kolmogorov-Smirnov 5% Critical Value	0.245	97.5% Chebyshev(Mean, Sd) UCL	13.61
Data follow Appr. Gamma Distribution at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	15.58
Assuming Gamma Distribution			
95% Approximate Gamma UCL	11.41		
95% Adjusted Gamma UCL	11.6		
Potential UCL to Use		Use 95% Student's-t UCL	11.24

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	8
Raw Statistics		Log-transformed Statistics	
Minimum	32.24	Minimum of Log Data	3.473
Maximum	85	Maximum of Log Data	4.443
Mean	58.51	Mean of log Data	3.986
Median	50.18	SD of log Data	0.429
SD	24.3		
Coefficient of Variation	0.415		
Skewness	0.186		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.779
Shapiro Wilk Test Statistic	0.752	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	71.1	95% H-UCL	77.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	90.75
95% Adjusted-CLT UCL (Chen-1995)	70.45	97.5% Chebyshev (MVUE) UCL	104.7
95% Modified-t UCL (Johnson-1978)	71.17	99% Chebyshev (MVUE) UCL	132
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.688	Data do not follow a Discernable Distribution (0.05)	
Theta Star	12.48		
MLE of Mean	58.51		
MLE of Standard Deviation	27.02		
nu star	112.5		
Approximate Chi Square Value (.05)	89.03	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	70.04
Adjusted Chi Square Value	85.84	95% Jackknife UCL	71.1
		95% Standard Bootstrap UCL	69.41
		95% Bootstrap-t UCL	71.61
		95% Hall's Bootstrap UCL	67.99
		95% Percentile Bootstrap UCL	69.8
		95% BCA Bootstrap UCL	70.18
		95% Chebyshev(Mean, Sd) UCL	89.08
		97.5% Chebyshev(Mean, Sd) UCL	102.3
		99% Chebyshev(Mean, Sd) UCL	128.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL	73.94		
95% Adjusted Gamma UCL	76.68		
Potential UCL to Use		Use 95% Student's-t UCL	71.1
		or 95% Modified-t UCL	71.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
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Raw Statistics

Minimum	35	Log-transformed Statistics	
Maximum	275.7	Minimum of Log Data	3.555
Mean	97.86	Maximum of Log Data	5.619
Median	84.67	Mean of log Data	4.384
SD	69.09	SD of log Data	0.653
Coefficient of Variation	0.706		
Skewness	1.682		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	133.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	157.4
95% Adjusted-CLT UCL (Chen-1995)	141	95% Chebyshev (MVUE) UCL	180
95% Modified-t UCL (Johnson-1978)	135.3	97.5% Chebyshev (MVUE) UCL	215.8
		99% Chebyshev (MVUE) UCL	286.2

Gamma Distribution Test

k star (bias corrected)	2.054	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	47.64		
MLE of Mean	97.86		
MLE of Standard Deviation	68.28		
nu star	49.3		
Approximate Chi Square Value (.05)	34.18	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	130.7
Adjusted Chi Square Value	32.27	95% Jackknife UCL	133.7
		95% Standard Bootstrap UCL	129.2
		95% Bootstrap-t UCL	157.9
		95% Hall's Bootstrap UCL	291.6
		95% Percentile Bootstrap UCL	130.6
		95% BCA Bootstrap UCL	142.1
		95% Chebyshev(Mean, Sd) UCL	184.8
		97.5% Chebyshev(Mean, Sd) UCL	222.4
		99% Chebyshev(Mean, Sd) UCL	296.3

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.311		
Anderson-Darling 5% Critical Value	0.74		
Kolmogorov-Smirnov Test Statistic	0.138		
Kolmogorov-Smirnov 5% Critical Value	0.248		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	141.2		
95% Adjusted Gamma UCL	149.5		

Potential UCL to Use

Use 95% Approximate Gamma UCL	141.2
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
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Raw Statistics

Minimum	11544	Log-transformed Statistics	
Maximum	39015	Minimum of Log Data	9.354
Mean	23033	Maximum of Log Data	10.57
Median	20803	Mean of log Data	9.985
SD	8520	SD of log Data	0.359
Coefficient of Variation	0.37		
Skewness	0.861		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	27450	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	28677
95% Adjusted-CLT UCL (Chen-1995)	27732	95% Chebyshev (MVUE) UCL	33531
95% Modified-t UCL (Johnson-1978)	27552	97.5% Chebyshev (MVUE) UCL	38083
		99% Chebyshev (MVUE) UCL	47025

Gamma Distribution Test

k star (bias corrected)	6.46	Data Distribution	
Theta Star	3566	Data appear Normal at 5% Significance Level	
MLE of Mean	23033		
MLE of Standard Deviation	9062		
nu star	155		
Approximate Chi Square Value (.05)	127.3	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	27078
Adjusted Chi Square Value	123.4	95% Jackknife UCL	27450
		95% Standard Bootstrap UCL	26855
		95% Bootstrap-t UCL	28720
		95% Hall's Bootstrap UCL	29319
		95% Percentile Bootstrap UCL	27066
		95% BCA Bootstrap UCL	27390
		95% Chebyshev(Mean, Sd) UCL	33754
		97.5% Chebyshev(Mean, Sd) UCL	38393
		99% Chebyshev(Mean, Sd) UCL	47505

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.316		
Anderson-Darling 5% Critical Value	0.731		
Kolmogorov-Smirnov Test Statistic	0.159		
Kolmogorov-Smirnov 5% Critical Value	0.246		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	28062		
95% Adjusted Gamma UCL	28934		

Potential UCL to Use

Use 95% Student's-t UCL	27450
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.92	Log-transformed Statistics	
Maximum	43.71	Minimum of Log Data	-0.0834
Mean	12.1	Maximum of Log Data	3.778
Median	10	Mean of log Data	2.229
SD	10.32	SD of log Data	0.846
Coefficient of Variation	0.853		
Skewness	2.98		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.517	Shapiro Wilk Test Statistic	0.633
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	17.46	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	26.08
95% Adjusted-CLT UCL (Chen-1995)	19.74	95% Chebyshev (MVUE) UCL	27.17
95% Modified-t UCL (Johnson-1978)	17.88	97.5% Chebyshev (MVUE) UCL	33.39
		99% Chebyshev (MVUE) UCL	45.61

Gamma Distribution Test

k star (bias corrected)	1.587	Data Distribution	
Theta Star	7.625	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	12.1		
MLE of Standard Deviation	9.607		
nu star	38.09	Nonparametric Statistics	
Approximate Chi Square Value (.05)	24.96	95% CLT UCL	17.01
Adjusted Level of Significance	0.029	95% Jackknife UCL	17.46
Adjusted Chi Square Value	23.35	95% Standard Bootstrap UCL	16.94

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.221	95% Bootstrap-t UCL	39.43
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	43.9
Kolmogorov-Smirnov Test Statistic	0.344	95% Percentile Bootstrap UCL	17.67
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	18.78
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	25.09
		97.5% Chebyshev(Mean, Sd) UCL	30.71
		99% Chebyshev(Mean, Sd) UCL	41.76

Assuming Gamma Distribution

95% Approximate Gamma UCL	18.47
95% Adjusted Gamma UCL	19.75

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	25.09
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	65	Minimum of Log Data	4.174
Maximum	950.8	Maximum of Log Data	6.857
Mean	442.4	Mean of log Data	5.791
Median	445.1	SD of log Data	0.897
SD	304.7		
Coefficient of Variation	0.689		
Skewness	0.41		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	600.4	95% H-UCL	1024
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1029
95% Adjusted-CLT UCL (Chen-1995)	598.2	97.5% Chebyshev (MVUE) UCL	1272
95% Modified-t UCL (Johnson-1978)	602.1	99% Chebyshev (MVUE) UCL	1748
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.41	Data appear Normal at 5% Significance Level	
Theta Star	313.8		
MLE of Mean	442.4	Nonparametric Statistics	
MLE of Standard Deviation	372.6	95% CLT UCL	587.1
nu star	33.84	95% Jackknife UCL	600.4
Approximate Chi Square Value (.05)	21.54	95% Standard Bootstrap UCL	581.1
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	621.5
Adjusted Chi Square Value	20.05	95% Hall's Bootstrap UCL	591.8
Anderson-Darling Test Statistic	0.587	95% Percentile Bootstrap UCL	588.5
Anderson-Darling 5% Critical Value	0.743	95% BCA Bootstrap UCL	590.1
Kolmogorov-Smirnov Test Statistic	0.222	95% Chebyshev(Mean, Sd) UCL	825.8
Kolmogorov-Smirnov 5% Critical Value	0.249	97.5% Chebyshev(Mean, Sd) UCL	991.7
Data appear Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	1317
Assuming Gamma Distribution			
95% Approximate Gamma UCL	695.2		
95% Adjusted Gamma UCL	746.7		
Potential UCL to Use		Use 95% Student's-t UCL	600.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	1.1	Minimum of Log Data	0.0953
Maximum	10	Maximum of Log Data	2.303
Mean	6.009	Mean of log Data	1.672
Median	5	SD of log Data	0.582
SD	2.68		
Coefficient of Variation	0.446		
Skewness	0.369		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.784	Shapiro Wilk Test Statistic	0.715
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.398	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.345
95% Adjusted-CLT UCL (Chen-1995)	7.37	95% Chebyshev (MVUE) UCL	10.88
95% Modified-t UCL (Johnson-1978)	7.412	97.5% Chebyshev (MVUE) UCL	12.91
		99% Chebyshev (MVUE) UCL	16.89

Gamma Distribution Test

k star (bias corrected)	3.264	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.841		
MLE of Mean	6.009		
MLE of Standard Deviation	3.326		
nu star	78.34		
Approximate Chi Square Value (.05)	58.95	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	7.282
Adjusted Chi Square Value	56.39	95% Jackknife UCL	7.398
		95% Standard Bootstrap UCL	7.233

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.351	95% Bootstrap-t UCL	7.501
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	7.477
Kolmogorov-Smirnov Test Statistic	0.336	95% Percentile Bootstrap UCL	7.252
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	7.252
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.381
		97.5% Chebyshev(Mean, Sd) UCL	10.84
		99% Chebyshev(Mean, Sd) UCL	13.71

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.986
95% Adjusted Gamma UCL	8.348

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 9.381

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

12

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	14.07	Minimum of Log Data	2.644
Maximum	542	Maximum of Log Data	6.295
Mean	203.3	Mean of log Data	4.794
Median	200.1	SD of log Data	1.274
SD	164.2		
Coefficient of Variation	0.808		
Skewness	0.648		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.849
Shapiro Wilk Test Statistic	0.909	Shapiro Wilk Critical Value	0.859
Shapiro Wilk Critical Value	0.859	Data not Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	288.4	95% H-UCL	1017
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	671.2
95% Adjusted-CLT UCL (Chen-1995)	290.7	97.5% Chebyshev (MVUE) UCL	855.8
95% Modified-t UCL (Johnson-1978)	289.9	99% Chebyshev (MVUE) UCL	1218
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.878	Data appear Normal at 5% Significance Level	
Theta Star	231.5		
MLE of Mean	203.3	Nonparametric Statistics	
MLE of Standard Deviation	216.9	95% CLT UCL	281.3
nu star	21.07	95% Jackknife UCL	288.4
Approximate Chi Square Value (.05)	11.64	95% Standard Bootstrap UCL	280.8
Adjusted Level of Significance	0.029	95% Bootstrap-t UCL	303.1
Adjusted Chi Square Value	10.59	95% Hall's Bootstrap UCL	305.7
Anderson-Darling Test Statistic	0.648	95% Percentile Bootstrap UCL	278
Anderson-Darling 5% Critical Value	0.755	95% BCA Bootstrap UCL	286.7
Kolmogorov-Smirnov Test Statistic	0.27	95% Chebyshev(Mean, Sd) UCL	409.9
Kolmogorov-Smirnov 5% Critical Value	0.252	97.5% Chebyshev(Mean, Sd) UCL	499.4
Data follow Appr. Gamma Distribution at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	675
Assuming Gamma Distribution			
95% Approximate Gamma UCL	367.8		
95% Adjusted Gamma UCL	404.5		
Potential UCL to Use		Use 95% Student's-t UCL	288.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-234

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-234 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-235

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	518-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	5
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Raw Statistics

Minimum	4.43	Log-transformed Statistics	
Maximum	9.3	Minimum of Log Data	1.488
Mean	6.051	Maximum of Log Data	2.23
Median	6.051	Mean of log Data	1.787
SD	1.075	SD of log Data	0.162
Coefficient of Variation	0.178		
Skewness	1.794		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.68	Shapiro Wilk Test Statistic	0.736
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.446	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.437
95% Adjusted-CLT UCL (Chen-1995)	6.522	95% Chebyshev (MVUE) UCL	6.96
95% Modified-t UCL (Johnson-1978)	6.46	97.5% Chebyshev (MVUE) UCL	7.355
		99% Chebyshev (MVUE) UCL	8.132

Gamma Distribution Test

k star (bias corrected)	32.86	Data Distribution	
Theta Star	0.184	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	6.051		
MLE of Standard Deviation	1.056		
nu star	1446		
Approximate Chi Square Value (.05)	1358	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	6.428
Adjusted Chi Square Value	1352	95% Jackknife UCL	6.446

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.01	95% Standard Bootstrap UCL	6.417
Anderson-Darling 5% Critical Value	0.742	95% Bootstrap-t UCL	6.68
Kolmogorov-Smirnov Test Statistic	0.388	95% Hall's Bootstrap UCL	9.142
Kolmogorov-Smirnov 5% Critical Value	0.185	95% Percentile Bootstrap UCL	6.434
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	6.529

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.44	95% Chebyshev(Mean, Sd) UCL	7.05
95% Adjusted Gamma UCL	6.47	97.5% Chebyshev(Mean, Sd) UCL	7.482
		99% Chebyshev(Mean, Sd) UCL	8.331
Potential UCL to Use		Use 95% Student's-t UCL	6.446
		or 95% Modified-t UCL	6.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Carbazole

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	0.46	Minimum of Log Data	-0.777
Maximum	37	Maximum of Log Data	3.611
Mean	4.634	Mean of log Data	0.737
Median	4.634	SD of log Data	1.327
SD	7.625		
Coefficient of Variation	1.645		
Skewness	3.937		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.479	Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	7.431	95% H-UCL	12.26
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.6
95% Adjusted-CLT UCL (Chen-1995)	8.766	97.5% Chebyshev (MVUE) UCL	14.58
95% Modified-t UCL (Johnson-1978)	7.658	99% Chebyshev (MVUE) UCL	20.43
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.679	Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.82		
MLE of Mean	4.634		
MLE of Standard Deviation	5.622		
nu star	29.9		
Approximate Chi Square Value (.05)	18.41	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	7.308
Adjusted Chi Square Value	17.74	95% Jackknife UCL	7.431
		95% Standard Bootstrap UCL	7.237
		95% Bootstrap-t UCL	11.57
		95% Hall's Bootstrap UCL	18.1
		95% Percentile Bootstrap UCL	7.546
		95% BCA Bootstrap UCL	9.729
		95% Chebyshev(Mean, Sd) UCL	11.72
		97.5% Chebyshev(Mean, Sd) UCL	14.79
		99% Chebyshev(Mean, Sd) UCL	20.81
Anderson-Darling Test Statistic			
Anderson-Darling 5% Critical Value	0.783		
Kolmogorov-Smirnov Test Statistic	0.25		
Kolmogorov-Smirnov 5% Critical Value	0.193		
Data not Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution			
95% Approximate Gamma UCL	7.524		
95% Adjusted Gamma UCL	7.81		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	11.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	8
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Raw Statistics

Minimum	2.5	Log-transformed Statistics	
Maximum	17.6	Minimum of Log Data	0.916
Mean	5.77	Maximum of Log Data	2.868
Median	5.77	Mean of log Data	1.683
SD	2.817	SD of log Data	0.351
Coefficient of Variation	0.488		
Skewness	3.719		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.484	Shapiro Wilk Test Statistic	0.691
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.804	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.607
95% Adjusted-CLT UCL (Chen-1995)	7.267	95% Chebyshev (MVUE) UCL	7.604
95% Modified-t UCL (Johnson-1978)	6.883	97.5% Chebyshev (MVUE) UCL	8.425
		99% Chebyshev (MVUE) UCL	10.04

Gamma Distribution Test

k star (bias corrected)	6.396	Data Distribution	
Theta Star	0.902	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.77		
MLE of Standard Deviation	2.282		
nu star	281.4		
Approximate Chi Square Value (.05)	243.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	6.758
Adjusted Chi Square Value	240.9	95% Jackknife UCL	6.804
		95% Standard Bootstrap UCL	6.735
Anderson-Darling Test Statistic	3.296	95% Bootstrap-t UCL	7.774
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	11.14
Kolmogorov-Smirnov Test Statistic	0.406	95% Percentile Bootstrap UCL	6.928
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	7.352
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.388
		97.5% Chebyshev(Mean, Sd) UCL	9.521
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.75
95% Approximate Gamma UCL	6.667		
95% Adjusted Gamma UCL	6.739		

Potential UCL to Use

Use 95% Student's-t UCL	6.804
or 95% Modified-t UCL	6.883

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	8
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Raw Statistics

Minimum	6.9	Log-transformed Statistics	
Maximum	24.8	Minimum of Log Data	1.932
Mean	11.65	Maximum of Log Data	3.211
Median	11.65	Mean of log Data	2.425
SD	3.304	SD of log Data	0.238
Coefficient of Variation	0.284		
Skewness	2.969		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.536	Shapiro Wilk Test Statistic	0.648
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.77
95% Adjusted-CLT UCL (Chen-1995)	13.28	95% Chebyshev (MVUE) UCL	14.21
95% Modified-t UCL (Johnson-1978)	12.93	97.5% Chebyshev (MVUE) UCL	15.33
		99% Chebyshev (MVUE) UCL	17.53

Gamma Distribution Test

k star (bias corrected)	14.81	Data Distribution	
Theta Star	0.787	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.65		
MLE of Standard Deviation	3.026		
nu star	651.5	Nonparametric Statistics	
Approximate Chi Square Value (.05)	593.3	95% CLT UCL	12.8
Adjusted Level of Significance	0.0386	95% Jackknife UCL	12.86
Adjusted Chi Square Value	589.1	95% Standard Bootstrap UCL	12.76
		95% Bootstrap-t UCL	13.45
Anderson-Darling Test Statistic	3.825	95% Hall's Bootstrap UCL	18.49
Anderson-Darling 5% Critical Value	0.741	95% Percentile Bootstrap UCL	12.88
Kolmogorov-Smirnov Test Statistic	0.377	95% BCA Bootstrap UCL	13.39
Kolmogorov-Smirnov 5% Critical Value	0.185	95% Chebyshev(Mean, Sd) UCL	14.72
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	16.05
		99% Chebyshev(Mean, Sd) UCL	18.66
Assuming Gamma Distribution			
95% Approximate Gamma UCL	12.79		
95% Adjusted Gamma UCL	12.88		

Potential UCL to Use

Use 95% Student's-t UCL	12.86
or 95% Modified-t UCL	12.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.1	Log-transformed Statistics	
Maximum	1.64	Minimum of Log Data	-2.303
Mean	0.318	Maximum of Log Data	0.495
Median	0.318	Mean of log Data	-1.445
SD	0.336	SD of log Data	0.728
Coefficient of Variation	1.056		
Skewness	3.26		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.557	Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.441	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.438
95% Adjusted-CLT UCL (Chen-1995)	0.489	95% Chebyshev (MVUE) UCL	0.523
95% Modified-t UCL (Johnson-1978)	0.45	97.5% Chebyshev (MVUE) UCL	0.618
		99% Chebyshev (MVUE) UCL	0.805

Gamma Distribution Test

k star (bias corrected)	1.599	Data Distribution	
Theta Star	0.199	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.318		
MLE of Standard Deviation	0.252		
nu star	70.34		
Approximate Chi Square Value (.05)	52.03	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	0.436
Adjusted Chi Square Value	50.85	95% Jackknife UCL	0.441
		95% Standard Bootstrap UCL	0.432
Anderson-Darling Test Statistic	1.938	95% Bootstrap-t UCL	0.617
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	1.034
Kolmogorov-Smirnov Test Statistic	0.31	95% Percentile Bootstrap UCL	0.442
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	0.497
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.63
		97.5% Chebyshev(Mean, Sd) UCL	0.766
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.031
95% Approximate Gamma UCL	0.43		
95% Adjusted Gamma UCL	0.44		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.63
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Pyrene

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	14
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Raw Statistics

Minimum	0.098	Log-transformed Statistics	
Maximum	150	Minimum of Log Data	-2.323
Mean	22.33	Maximum of Log Data	5.011
Median	22.33	Mean of log Data	1.995
SD	32.44	SD of log Data	1.89
Coefficient of Variation	1.453		
Skewness	3.138		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.624	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	34.24	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	228.2
95% Adjusted-CLT UCL (Chen-1995)	38.65	95% Chebyshev (MVUE) UCL	116.4
95% Modified-t UCL (Johnson-1978)	35.01	97.5% Chebyshev (MVUE) UCL	151
		99% Chebyshev (MVUE) UCL	219

Gamma Distribution Test

k star (bias corrected)	0.515	Data Distribution	
Theta Star	43.34	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	22.33		
MLE of Standard Deviation	31.11		
nu star	22.67		
Approximate Chi Square Value (.05)	12.84	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	33.71
Adjusted Chi Square Value	12.29	95% Jackknife UCL	34.24
		95% Standard Bootstrap UCL	33.16
		95% Bootstrap-t UCL	45.92
		95% Hall's Bootstrap UCL	81.26
		95% Percentile Bootstrap UCL	34.5
		95% BCA Bootstrap UCL	39.83
		95% Chebyshev(Mean, Sd) UCL	52.48
		97.5% Chebyshev(Mean, Sd) UCL	65.53
		99% Chebyshev(Mean, Sd) UCL	91.15

Anderson-Darling Test Statistic	0.683
Anderson-Darling 5% Critical Value	0.799
Kolmogorov-Smirnov Test Statistic	0.219
Kolmogorov-Smirnov 5% Critical Value	0.195
Data follow Appr. Gamma Distribution at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	39.43
95% Adjusted Gamma UCL	41.19

Potential UCL to Use	Use 95% Approximate Gamma UCL	39.43
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	13
Raw Statistics		Log-transformed Statistics	
Minimum	0.0872	Minimum of Log Data	-2.44
Maximum	111.8	Maximum of Log Data	4.717
Mean	16.66	Mean of log Data	1.717
Median	16.66	SD of log Data	1.872
SD	24		
Coefficient of Variation	1.441		
Skewness	3.201		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.614	Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	25.46	95% H-UCL	162.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	85.05
95% Adjusted-CLT UCL (Chen-1995)	28.8	97.5% Chebyshev (MVUE) UCL	110.3
95% Modified-t UCL (Johnson-1978)	26.04	99% Chebyshev (MVUE) UCL	159.8
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.521	Data do not follow a Discernable Distribution (0.05)	
Theta Star	31.95		
MLE of Mean	16.66		
MLE of Standard Deviation	23.07		
nu star	22.94		
Approximate Chi Square Value (.05)	13.05	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	25.07
Adjusted Chi Square Value	12.49	95% Jackknife UCL	25.46
		95% Standard Bootstrap UCL	24.61
		95% Bootstrap-t UCL	33.63
		95% Hall's Bootstrap UCL	61.57
		95% Percentile Bootstrap UCL	26.02
		95% BCA Bootstrap UCL	29.33
		95% Chebyshev(Mean, Sd) UCL	38.96
		97.5% Chebyshev(Mean, Sd) UCL	48.61
		99% Chebyshev(Mean, Sd) UCL	67.56
Anderson-Darling Test Statistic			
Anderson-Darling 5% Critical Value	0.798		
Kolmogorov-Smirnov Test Statistic	0.218		
Kolmogorov-Smirnov 5% Critical Value	0.195		
Data not Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution			
95% Approximate Gamma UCL	29.29		
95% Adjusted Gamma UCL	30.59		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	38.96

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	5
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Raw Statistics

Minimum	9.12	Log-transformed Statistics	
Maximum	2000	Minimum of Log Data	2.21
Mean	885.2	Maximum of Log Data	7.601
Median	885.2	Mean of log Data	6.52
SD	445.6	SD of log Data	1.089
Coefficient of Variation	0.503		
Skewness	0.875		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.656	Shapiro Wilk Test Statistic	0.51
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1049	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2338
95% Adjusted-CLT UCL (Chen-1995)	1060	95% Chebyshev (MVUE) UCL	2545
95% Modified-t UCL (Johnson-1978)	1052	97.5% Chebyshev (MVUE) UCL	3136
		99% Chebyshev (MVUE) UCL	4297

Gamma Distribution Test

k star (bias corrected)	1.788	Data Distribution	
Theta Star	495.2	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	885.2		
MLE of Standard Deviation	662.1		
nu star	78.66		
Approximate Chi Square Value (.05)	59.23	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	1041
Adjusted Chi Square Value	57.97	95% Jackknife UCL	1049
		95% Standard Bootstrap UCL	1041
Anderson-Darling Test Statistic	4.231	95% Bootstrap-t UCL	1088
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	1234
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	1048
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	1058
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1299
		97.5% Chebyshev(Mean, Sd) UCL	1478
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1830
95% Approximate Gamma UCL	1176		
95% Adjusted Gamma UCL	1201		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	1299
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.024	Log-transformed Statistics	
Maximum	0.163	Minimum of Log Data	-3.73
Mean	0.058	Maximum of Log Data	-1.814
Median	0.058	Mean of log Data	-2.914
SD	0.0258	SD of log Data	0.357
Coefficient of Variation	0.444		
Skewness	3.291		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.494	Shapiro Wilk Test Statistic	0.649
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0674	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.067
95% Adjusted-CLT UCL (Chen-1995)	0.0711	95% Chebyshev (MVUE) UCL	0.0772
95% Modified-t UCL (Johnson-1978)	0.0681	97.5% Chebyshev (MVUE) UCL	0.0856
		99% Chebyshev (MVUE) UCL	0.102

Gamma Distribution Test

k star (bias corrected)	6.7	Data Distribution	
Theta Star	0.0087	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.058		
MLE of Standard Deviation	0.0224	Nonparametric Statistics	
nu star	294.8	95% CLT UCL	0.067
Approximate Chi Square Value (.05)	256	95% Jackknife UCL	0.0674
Adjusted Level of Significance	0.0386	95% Standard Bootstrap UCL	0.0671
Adjusted Chi Square Value	253.3	95% Bootstrap-t UCL	0.073
Anderson-Darling Test Statistic	3.991	95% Hall's Bootstrap UCL	0.109
Anderson-Darling 5% Critical Value	0.745	95% Percentile Bootstrap UCL	0.0675
Kolmogorov-Smirnov Test Statistic	0.407	95% BCA Bootstrap UCL	0.0735
Kolmogorov-Smirnov 5% Critical Value	0.186	95% Chebyshev(Mean, Sd) UCL	0.0819
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	0.0923
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.113
95% Approximate Gamma UCL	0.0668		
95% Adjusted Gamma UCL	0.0675		

Potential UCL to Use

Use 95% Student's-t UCL	0.0674
or 95% Modified-t UCL	0.0681

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.684	Log-transformed Statistics	
Maximum	3.04	Minimum of Log Data	-0.38
Mean	1.361	Maximum of Log Data	1.112
Median	1.361	Mean of log Data	0.274
SD	0.418	SD of log Data	0.258
Coefficient of Variation	0.307		
Skewness	3.066		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.505	Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.514	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.505
95% Adjusted-CLT UCL (Chen-1995)	1.569	95% Chebyshev (MVUE) UCL	1.686
95% Modified-t UCL (Johnson-1978)	1.524	97.5% Chebyshev (MVUE) UCL	1.828
		99% Chebyshev (MVUE) UCL	2.107

Gamma Distribution Test

k star (bias corrected)	12.78	Data Distribution	
Theta Star	0.106	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.361		
MLE of Standard Deviation	0.381		
nu star	562.5	Nonparametric Statistics	
Approximate Chi Square Value (.05)	508.5	95% CLT UCL	1.507
Adjusted Level of Significance	0.0386	95% Jackknife UCL	1.514
Adjusted Chi Square Value	504.6	95% Standard Bootstrap UCL	1.504
		95% Bootstrap-t UCL	1.595
Anderson-Darling Test Statistic	4.217	95% Hall's Bootstrap UCL	2.223
Anderson-Darling 5% Critical Value	0.742	95% Percentile Bootstrap UCL	1.513
Kolmogorov-Smirnov Test Statistic	0.42	95% BCA Bootstrap UCL	1.576
Kolmogorov-Smirnov 5% Critical Value	0.185	95% Chebyshev(Mean, Sd) UCL	1.749
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	1.917
		99% Chebyshev(Mean, Sd) UCL	2.247
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.505		
95% Adjusted Gamma UCL	1.517		

Potential UCL to Use

Use 95% Student's-t UCL	1.514
or 95% Modified-t UCL	1.524

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	518-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Carbazole

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	10
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Raw Statistics

Minimum	4.46	Log-transformed Statistics	
Maximum	37	Minimum of Log Data	-0.777
Mean	4.634	Maximum of Log Data	3.611
Median	4.634	Mean of log Data	0.737
SD	7.625	SD of log Data	1.327
Coefficient of Variation	1.645		
Skewness	3.937		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.479	Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.431	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.26
95% Adjusted-CLT UCL (Chen-1995)	8.766	95% Chebyshev (MVUE) UCL	11.6
95% Modified-t UCL (Johnson-1978)	7.658	97.5% Chebyshev (MVUE) UCL	14.58
		99% Chebyshev (MVUE) UCL	20.43

Gamma Distribution Test

k star (bias corrected)	0.679	Data Distribution	
Theta Star	6.82	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	4.634		
MLE of Standard Deviation	5.622		
nu star	29.9		
Approximate Chi Square Value (.05)	18.41	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	7.308
Adjusted Chi Square Value	17.74	95% Jackknife UCL	7.431

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.956	95% Standard Bootstrap UCL	7.268
Anderson-Darling 5% Critical Value	0.783	95% Bootstrap-t UCL	11.57
Kolmogorov-Smirnov Test Statistic	0.25	95% Hall's Bootstrap UCL	18.12
Kolmogorov-Smirnov 5% Critical Value	0.193	95% Percentile Bootstrap UCL	7.688
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.045
		95% Chebyshev(Mean, Sd) UCL	11.72
		97.5% Chebyshev(Mean, Sd) UCL	14.79
		99% Chebyshev(Mean, Sd) UCL	20.81

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.524
95% Adjusted Gamma UCL	7.81

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 11.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	8
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Raw Statistics

Minimum	2.5	Log-transformed Statistics	
Maximum	17.6	Minimum of Log Data	0.916
Mean	5.77	Maximum of Log Data	2.868
Median	5.77	Mean of log Data	1.683
SD	2.817	SD of log Data	0.351
Coefficient of Variation	0.488		
Skewness	3.719		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.484	Shapiro Wilk Test Statistic	0.691
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	6.804	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	6.607
95% Adjusted-CLT UCL (Chen-1995)	7.267	95% Chebyshev (MVUE) UCL	7.604
95% Modified-t UCL (Johnson-1978)	6.883	97.5% Chebyshev (MVUE) UCL	8.425
		99% Chebyshev (MVUE) UCL	10.04

Gamma Distribution Test

k star (bias corrected)	6.396	Data Distribution	
Theta Star	0.902	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.77		
MLE of Standard Deviation	2.282		
nu star	281.4		
Approximate Chi Square Value (.05)	243.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	6.758
Adjusted Chi Square Value	240.9	95% Jackknife UCL	6.804
		95% Standard Bootstrap UCL	6.743
Anderson-Darling Test Statistic	3.296	95% Bootstrap-t UCL	7.806
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	11.13
Kolmogorov-Smirnov Test Statistic	0.406	95% Percentile Bootstrap UCL	6.846
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	7.389
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.388
		97.5% Chebyshev(Mean, Sd) UCL	9.521
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.75
95% Approximate Gamma UCL	6.667		
95% Adjusted Gamma UCL	6.739		

Potential UCL to Use

Use 95% Student's-t UCL	6.804
or 95% Modified-t UCL	6.883

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	8
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Raw Statistics

Minimum	6.9	Log-transformed Statistics	
Maximum	24.8	Minimum of Log Data	1.932
Mean	11.65	Maximum of Log Data	3.211
Median	11.65	Mean of log Data	2.425
SD	3.304	SD of log Data	0.238
Coefficient of Variation	0.284		
Skewness	2.969		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.536	Shapiro Wilk Test Statistic	0.648
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	12.86	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	12.77
95% Adjusted-CLT UCL (Chen-1995)	13.28	95% Chebyshev (MVUE) UCL	14.21
95% Modified-t UCL (Johnson-1978)	12.93	97.5% Chebyshev (MVUE) UCL	15.33
		99% Chebyshev (MVUE) UCL	17.53

Gamma Distribution Test

k star (bias corrected)	14.81	Data Distribution	
Theta Star	0.787	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	11.65		
MLE of Standard Deviation	3.026		
nu star	651.5		
Approximate Chi Square Value (.05)	593.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	12.8
Adjusted Chi Square Value	589.1	95% Jackknife UCL	12.86
		95% Standard Bootstrap UCL	12.77
Anderson-Darling Test Statistic	3.825	95% Bootstrap-t UCL	13.5
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	18.44
Kolmogorov-Smirnov Test Statistic	0.377	95% Percentile Bootstrap UCL	12.88
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	13.29
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.72
		97.5% Chebyshev(Mean, Sd) UCL	16.05
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.66
95% Approximate Gamma UCL	12.79		
95% Adjusted Gamma UCL	12.88		

Potential UCL to Use

Use 95% Student's-t UCL	12.86
or 95% Modified-t UCL	12.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.1	Log-transformed Statistics	
Maximum	1.64	Minimum of Log Data	-2.303
Mean	0.318	Maximum of Log Data	0.495
Median	0.318	Mean of log Data	-1.445
SD	0.336	SD of log Data	0.728
Coefficient of Variation	1.056		
Skewness	3.26		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.557	Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.441	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.438
95% Adjusted-CLT UCL (Chen-1995)	0.489	95% Chebyshev (MVUE) UCL	0.523
95% Modified-t UCL (Johnson-1978)	0.45	97.5% Chebyshev (MVUE) UCL	0.618
		99% Chebyshev (MVUE) UCL	0.805

Gamma Distribution Test

k star (bias corrected)	1.599	Data Distribution	
Theta Star	0.199	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.318		
MLE of Standard Deviation	0.252		
nu star	70.34		
Approximate Chi Square Value (.05)	52.03	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	0.436
Adjusted Chi Square Value	50.85	95% Jackknife UCL	0.441
		95% Standard Bootstrap UCL	0.434
Anderson-Darling Test Statistic	1.938	95% Bootstrap-t UCL	0.617
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	1.028
Kolmogorov-Smirnov Test Statistic	0.31	95% Percentile Bootstrap UCL	0.447
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	0.505
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.63
		97.5% Chebyshev(Mean, Sd) UCL	0.766
		99% Chebyshev(Mean, Sd) UCL	1.031

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.43
95% Adjusted Gamma UCL	0.44

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.63
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Pyrene

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	14
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Raw Statistics

Minimum	0.098	Log-transformed Statistics	
Maximum	150	Minimum of Log Data	-2.323
Mean	22.33	Maximum of Log Data	5.011
Median	22.33	Mean of log Data	1.995
SD	32.44	SD of log Data	1.89
Coefficient of Variation	1.453		
Skewness	3.138		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.624	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	34.24	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	228.2
95% Adjusted-CLT UCL (Chen-1995)	38.65	95% Chebyshev (MVUE) UCL	116.4
95% Modified-t UCL (Johnson-1978)	35.01	97.5% Chebyshev (MVUE) UCL	151
		99% Chebyshev (MVUE) UCL	219

Gamma Distribution Test

k star (bias corrected)	0.515	Data Distribution	
Theta Star	43.34	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	22.33		
MLE of Standard Deviation	31.11		
nu star	22.67		
Approximate Chi Square Value (.05)	12.84	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	33.71
Adjusted Chi Square Value	12.29	95% Jackknife UCL	34.24
		95% Standard Bootstrap UCL	33.48
Anderson-Darling Test Statistic	0.683	95% Bootstrap-t UCL	45.9
Anderson-Darling 5% Critical Value	0.799	95% Hall's Bootstrap UCL	81.69
Kolmogorov-Smirnov Test Statistic	0.219	95% Percentile Bootstrap UCL	34.71
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	40.9
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	52.48
		97.5% Chebyshev(Mean, Sd) UCL	65.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	91.15
95% Approximate Gamma UCL	39.43		
95% Adjusted Gamma UCL	41.19		

Potential UCL to Use		Use 95% Approximate Gamma UCL	39.43
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	13
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Raw Statistics

Minimum	0.0872	Log-transformed Statistics	
Maximum	111.8	Minimum of Log Data	-2.44
Mean	16.66	Maximum of Log Data	4.717
Median	16.66	Mean of log Data	1.717
SD	24	SD of log Data	1.872
Coefficient of Variation	1.441		
Skewness	3.201		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.614	Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	25.46	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	162.4
95% Adjusted-CLT UCL (Chen-1995)	28.8	95% Chebyshev (MVUE) UCL	85.05
95% Modified-t UCL (Johnson-1978)	26.04	97.5% Chebyshev (MVUE) UCL	110.3
		99% Chebyshev (MVUE) UCL	159.8

Gamma Distribution Test

k star (bias corrected)	0.521	Data Distribution	
Theta Star	31.95	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	16.66		
MLE of Standard Deviation	23.07		
nu star	22.94		
Approximate Chi Square Value (.05)	13.05	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	25.07
Adjusted Chi Square Value	12.49	95% Jackknife UCL	25.46
		95% Standard Bootstrap UCL	25.02
Anderson-Darling Test Statistic	0.928	95% Bootstrap-t UCL	33.88
Anderson-Darling 5% Critical Value	0.798	95% Hall's Bootstrap UCL	61.46
Kolmogorov-Smirnov Test Statistic	0.218	95% Percentile Bootstrap UCL	26.26
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	29.95
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38.96
		97.5% Chebyshev(Mean, Sd) UCL	48.61
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	67.56
95% Approximate Gamma UCL	29.29		
95% Adjusted Gamma UCL	30.59		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	38.96
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	5
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Raw Statistics

Minimum	9.12	Log-transformed Statistics	
Maximum	2000	Minimum of Log Data	2.21
Mean	885.2	Maximum of Log Data	7.601
Median	885.2	Mean of log Data	6.52
SD	445.6	SD of log Data	1.089
Coefficient of Variation	0.503		
Skewness	0.875		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.656	Shapiro Wilk Test Statistic	0.51
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1049	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	2338
95% Adjusted-CLT UCL (Chen-1995)	1060	95% Chebyshev (MVUE) UCL	2545
95% Modified-t UCL (Johnson-1978)	1052	97.5% Chebyshev (MVUE) UCL	3136
		99% Chebyshev (MVUE) UCL	4297

Gamma Distribution Test

k star (bias corrected)	1.788	Data Distribution	
Theta Star	495.2	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	885.2		
MLE of Standard Deviation	662.1		
nu star	78.66		
Approximate Chi Square Value (.05)	59.23	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	1041
Adjusted Chi Square Value	57.97	95% Jackknife UCL	1049
		95% Standard Bootstrap UCL	1036
Anderson-Darling Test Statistic	4.231	95% Bootstrap-t UCL	1068
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	1234
Kolmogorov-Smirnov Test Statistic	0.457	95% Percentile Bootstrap UCL	1037
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	1058
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1299
		97.5% Chebyshev(Mean, Sd) UCL	1478
		99% Chebyshev(Mean, Sd) UCL	1830

Assuming Gamma Distribution

95% Approximate Gamma UCL	1176
95% Adjusted Gamma UCL	1201

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	1299
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.024	Log-transformed Statistics	
Maximum	0.163	Minimum of Log Data	-3.73
Mean	0.058	Maximum of Log Data	-1.814
Median	0.058	Mean of log Data	-2.914
SD	0.0258	SD of log Data	0.357
Coefficient of Variation	0.444		
Skewness	3.291		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.494	Shapiro Wilk Test Statistic	0.649
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0674	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.067
95% Adjusted-CLT UCL (Chen-1995)	0.0711	95% Chebyshev (MVUE) UCL	0.0772
95% Modified-t UCL (Johnson-1978)	0.0681	97.5% Chebyshev (MVUE) UCL	0.0856
		99% Chebyshev (MVUE) UCL	0.102

Gamma Distribution Test

k star (bias corrected)	6.7	Data Distribution	
Theta Star	0.00865	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.058		
MLE of Standard Deviation	0.0224		
nu star	294.8		
Approximate Chi Square Value (.05)	256	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	0.067
Adjusted Chi Square Value	253.3	95% Jackknife UCL	0.0674
		95% Standard Bootstrap UCL	0.0669
Anderson-Darling Test Statistic	3.991	95% Bootstrap-t UCL	0.0731
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.109
Kolmogorov-Smirnov Test Statistic	0.407	95% Percentile Bootstrap UCL	0.0674
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	0.0714
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0819
		97.5% Chebyshev(Mean, Sd) UCL	0.0923
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.113
95% Approximate Gamma UCL	0.0668		
95% Adjusted Gamma UCL	0.0675		

Potential UCL to Use

Use 95% Student's-t UCL	0.0674
or 95% Modified-t UCL	0.0681

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.684	Log-transformed Statistics	
Maximum	3.04	Minimum of Log Data	-0.38
Mean	1.361	Maximum of Log Data	1.112
Median	1.361	Mean of log Data	0.274
SD	0.418	SD of log Data	0.258
Coefficient of Variation	0.307		
Skewness	3.066		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.505	Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.514	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.505
95% Adjusted-CLT UCL (Chen-1995)	1.569	95% Chebyshev (MVUE) UCL	1.686
95% Modified-t UCL (Johnson-1978)	1.524	97.5% Chebyshev (MVUE) UCL	1.828
		99% Chebyshev (MVUE) UCL	2.107

Gamma Distribution Test

k star (bias corrected)	12.78	Data Distribution	
Theta Star	0.106	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.361		
MLE of Standard Deviation	0.381		
nu star	562.5		
Approximate Chi Square Value (.05)	508.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	1.507
Adjusted Chi Square Value	504.6	95% Jackknife UCL	1.514
		95% Standard Bootstrap UCL	1.501
Anderson-Darling Test Statistic	4.217	95% Bootstrap-t UCL	1.595
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	2.222
Kolmogorov-Smirnov Test Statistic	0.42	95% Percentile Bootstrap UCL	1.513
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	1.576
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.749
		97.5% Chebyshev(Mean, Sd) UCL	1.917
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.247
95% Approximate Gamma UCL	1.505		
95% Adjusted Gamma UCL	1.517		

Potential UCL to Use

Use 95% Student's-t UCL	1.514
or 95% Modified-t UCL	1.524

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	4810	Log-transformed Statistics	
Maximum	12100	Minimum of Log Data	8.478
Mean	8920	Maximum of Log Data	9.401
Median	8920	Mean of log Data	9.081
SD	1460	SD of log Data	0.192
Coefficient of Variation	0.164		
Skewness	-1.057		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.557
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9611	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9856
95% Adjusted-CLT UCL (Chen-1995)	9444	95% Chebyshev (MVUE) UCL	10945
95% Modified-t UCL (Johnson-1978)	9593	97.5% Chebyshev (MVUE) UCL	11814
		99% Chebyshev (MVUE) UCL	13521

Gamma Distribution Test

k star (bias corrected)	26.04	Data Distribution	
Theta Star	342.5	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8920		
MLE of Standard Deviation	1748		
nu star	729.2	Nonparametric Statistics	
Approximate Chi Square Value (.05)	667.5	95% CLT UCL	9562
Adjusted Level of Significance	0.0312	95% Jackknife UCL	9611
Adjusted Chi Square Value	659.7	95% Standard Bootstrap UCL	9534
		95% Bootstrap-t UCL	9487
Anderson-Darling Test Statistic	2.974	95% Hall's Bootstrap UCL	9557
Anderson-Darling 5% Critical Value	0.734	95% Percentile Bootstrap UCL	9501
Kolmogorov-Smirnov Test Statistic	0.452	95% BCA Bootstrap UCL	9434
Kolmogorov-Smirnov 5% Critical Value	0.228	95% Chebyshev(Mean, Sd) UCL	10621
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	11357
		99% Chebyshev(Mean, Sd) UCL	12803
Assuming Gamma Distribution			
95% Approximate Gamma UCL	9744		
95% Adjusted Gamma UCL	9860		

Potential UCL to Use

Use 95% Student's-t UCL	9611
or 95% Modified-t UCL	9593

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	9
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Raw Statistics

Minimum	5	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.609
Mean	8.491	Maximum of Log Data	2.398
Median	8.491	Mean of log Data	2.118
SD	1.751	SD of log Data	0.22
Coefficient of Variation	0.206		
Skewness	-0.17		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.32	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.52
95% Adjusted-CLT UCL (Chen-1995)	9.238	95% Chebyshev (MVUE) UCL	10.69
95% Modified-t UCL (Johnson-1978)	9.316	97.5% Chebyshev (MVUE) UCL	11.64
		99% Chebyshev (MVUE) UCL	13.5

Gamma Distribution Test

k star (bias corrected)	18.57	Data Distribution	
Theta Star	0.457	Data appear Normal at 5% Significance Level	
MLE of Mean	8.491		
MLE of Standard Deviation	1.97		
nu star	520		
Approximate Chi Square Value (.05)	468.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	9.261
Adjusted Chi Square Value	461.6	95% Jackknife UCL	9.32

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.623	95% Standard Bootstrap UCL	9.231
Anderson-Darling 5% Critical Value	0.734	95% Bootstrap-t UCL	9.302
Kolmogorov-Smirnov Test Statistic	0.242	95% Hall's Bootstrap UCL	9.286
Kolmogorov-Smirnov 5% Critical Value	0.228	95% Percentile Bootstrap UCL	9.211
Data follow Appr. Gamma Distribution at 5% Significance Level		95% BCA Bootstrap UCL	9.149
		95% Chebyshev(Mean, Sd) UCL	10.53
		97.5% Chebyshev(Mean, Sd) UCL	11.41
		99% Chebyshev(Mean, Sd) UCL	13.15

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.432
95% Adjusted Gamma UCL	9.566

Potential UCL to Use

Use 95% Student's-t UCL	9.32
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	79	Log-transformed Statistics	
Maximum	258	Minimum of Log Data	4.369
Mean	138.7	Maximum of Log Data	5.553
Median	138.7	Mean of log Data	4.901
SD	39.02	SD of log Data	0.252
Coefficient of Variation	0.281		
Skewness	2.139		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.635	Shapiro Wilk Test Statistic	0.72
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	157.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	158
95% Adjusted-CLT UCL (Chen-1995)	162.2	95% Chebyshev (MVUE) UCL	179.4
95% Modified-t UCL (Johnson-1978)	158.1	97.5% Chebyshev (MVUE) UCL	197.2
		99% Chebyshev (MVUE) UCL	232.1

Gamma Distribution Test

k star (bias corrected)	12.81	Data Distribution	
Theta Star	10.82	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	138.7		
MLE of Standard Deviation	38.73		
nu star	358.8		
Approximate Chi Square Value (.05)	315.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	155.8
Adjusted Chi Square Value	310.6	95% Jackknife UCL	157.1

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.178	95% Standard Bootstrap UCL	155.8
Anderson-Darling 5% Critical Value	0.734	95% Bootstrap-t UCL	164.5
Kolmogorov-Smirnov Test Statistic	0.396	95% Hall's Bootstrap UCL	246
Kolmogorov-Smirnov 5% Critical Value	0.228	95% Percentile Bootstrap UCL	155.7
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	161.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	157.5	95% Chebyshev(Mean, Sd) UCL	184.1
95% Adjusted Gamma UCL	160.2	97.5% Chebyshev(Mean, Sd) UCL	203.8
		99% Chebyshev(Mean, Sd) UCL	242.4

Potential UCL to Use

Use 95% Student's-t UCL	157.1
or 95% Modified-t UCL	158.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.4	Log-transformed Statistics	
Maximum	0.7	Minimum of Log Data	-0.916
Mean	0.548	Maximum of Log Data	-0.357
Median	0.548	Mean of log Data	-0.608
SD	0.0614	SD of log Data	0.115
Coefficient of Variation	0.112		
Skewness	0.119		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.716	Shapiro Wilk Test Statistic	0.706
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.577	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.58
95% Adjusted-CLT UCL (Chen-1995)	0.575	95% Chebyshev (MVUE) UCL	0.621
95% Modified-t UCL (Johnson-1978)	0.577	97.5% Chebyshev (MVUE) UCL	0.653
		99% Chebyshev (MVUE) UCL	0.715

Gamma Distribution Test

k star (bias corrected)	65.52	Data Distribution	
Theta Star	0.00836	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.548		
MLE of Standard Deviation	0.0676		
nu star	1835		
Approximate Chi Square Value (.05)	1736	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.575
Adjusted Chi Square Value	1723	95% Jackknife UCL	0.577

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.187	95% Standard Bootstrap UCL	0.574
Anderson-Darling 5% Critical Value	0.733	95% Bootstrap-t UCL	0.576
Kolmogorov-Smirnov Test Statistic	0.372	95% Hall's Bootstrap UCL	0.588
Kolmogorov-Smirnov 5% Critical Value	0.228	95% Percentile Bootstrap UCL	0.573
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	0.572

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.579	95% Chebyshev(Mean, Sd) UCL	0.619
95% Adjusted Gamma UCL	0.583	97.5% Chebyshev(Mean, Sd) UCL	0.65
		99% Chebyshev(Mean, Sd) UCL	0.711

Potential UCL to Use

Use 95% Student's-t UCL	0.577
or 95% Modified-t UCL	0.577

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cesium-137

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	-0.00601
Maximum	1.61
Mean	0.402
Median	0.402
SD	0.387
Coefficient of Variation	0.963
Skewness	2.428

Log-transformed Statistics
Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level	

Lognormal Distribution Test
Not Available

Assuming Normal Distribution

95% Student's-t UCL	0.585
Assuming Normal Distribution	
95% Student's-t UCL	0.585

Assuming Lognormal Distribution

95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen 1995)	0.644
95% Modified-t UCL (Johnson-1978)	0.596

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution
Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.853
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95% CLT UCL	0.572
95% Jackknife UCL	0.585
95% Standard Bootstrap UCL	0.572
95% Bootstrap-t UCL	0.68
95% Hall's Bootstrap UCL	1.378
95% Percentile Bootstrap UCL	0.575
95% BCA Bootstrap UCL	0.632
95% Chebyshev(Mean, Sd) UCL	0.853
97.5% Chebyshev(Mean, Sd) UCL	1.048
99% Chebyshev(Mean, Sd) UCL	1.431

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	9
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Raw Statistics

Minimum	6.8	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	1.917
Mean	47.15	Maximum of Log Data	4.443
Median	47.15	Mean of log Data	3.645
SD	26.13	SD of log Data	0.759
Coefficient of Variation	0.554		
Skewness	0.142		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Test Statistic	0.865
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	59.52	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	84.97
95% Adjusted-CLT UCL (Chen-1995)	58.92	95% Chebyshev (MVUE) UCL	96.36
95% Modified-t UCL (Johnson-1978)	59.56	97.5% Chebyshev (MVUE) UCL	116.5
		99% Chebyshev (MVUE) UCL	156.1

Gamma Distribution Test

k star (bias corrected)	2.058	Data Distribution	
Theta Star	22.92	Data appear Normal at 5% Significance Level	
MLE of Mean	47.15		
MLE of Standard Deviation	32.87		
nu star	57.61		
Approximate Chi Square Value (.05)	41.16	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	58.64
Adjusted Chi Square Value	39.32	95% Jackknife UCL	59.52

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.601	95% Standard Bootstrap UCL	58.02
Anderson-Darling 5% Critical Value	0.744	95% Bootstrap-t UCL	59.78
Kolmogorov-Smirnov Test Statistic	0.201	95% Hall's Bootstrap UCL	59.21
Kolmogorov-Smirnov 5% Critical Value	0.231	95% Percentile Bootstrap UCL	58.18
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	58.27

Assuming Gamma Distribution

95% Approximate Gamma UCL	65.99	95% Chebyshev(Mean, Sd) UCL	77.59
95% Adjusted Gamma UCL	69.08	97.5% Chebyshev(Mean, Sd) UCL	90.76
		99% Chebyshev(Mean, Sd) UCL	116.6

Potential UCL to Use

Use 95% Student's-t UCL	59.52
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	4.6	Log-transformed Statistics	
Maximum	17.9	Minimum of Log Data	1.526
Mean	9.453	Maximum of Log Data	2.885
Median	9.453	Mean of log Data	2.21
SD	2.793	SD of log Data	0.277
Coefficient of Variation	0.295		
Skewness	1.965		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.636	Shapiro Wilk Test Statistic	0.701
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.77	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.94
95% Adjusted-CLT UCL (Chen-1995)	11.1	95% Chebyshev (MVUE) UCL	12.53
95% Modified-t UCL (Johnson-1978)	10.84	97.5% Chebyshev (MVUE) UCL	13.86
		99% Chebyshev (MVUE) UCL	16.47

Gamma Distribution Test

k star (bias corrected)	11.1	Data Distribution	
Theta Star	0.852	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.453		
MLE of Standard Deviation	2.838		
nu star	310.7		
Approximate Chi Square Value (.05)	270.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	10.68
Adjusted Chi Square Value	265.9	95% Jackknife UCL	10.77

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.252	95% Standard Bootstrap UCL	10.62
Anderson-Darling 5% Critical Value	0.734	95% Bootstrap-t UCL	11.16
Kolmogorov-Smirnov Test Statistic	0.393	95% Hall's Bootstrap UCL	17.53
Kolmogorov-Smirnov 5% Critical Value	0.229	95% Percentile Bootstrap UCL	10.78
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	11.02
		95% Chebyshev(Mean, Sd) UCL	12.71
		97.5% Chebyshev(Mean, Sd) UCL	14.11
		99% Chebyshev(Mean, Sd) UCL	16.88

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.84		
95% Adjusted Gamma UCL	11.04		

Potential UCL to Use

		Use 95% Student's-t UCL	10.77
		or 95% Modified-t UCL	10.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	11
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Raw Statistics

Minimum	7901	Log-transformed Statistics	
Maximum	32605	Minimum of Log Data	8.975
Mean	14151	Maximum of Log Data	10.39
Median	14151	Mean of log Data	9.495
SD	5980	SD of log Data	0.347
Coefficient of Variation	0.423		
Skewness	2.413		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.74	Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16981	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17012
95% Adjusted-CLT UCL (Chen-1995)	17881	95% Chebyshev (MVUE) UCL	19822
95% Modified-t UCL (Johnson-1978)	17153	97.5% Chebyshev (MVUE) UCL	22316
		99% Chebyshev (MVUE) UCL	27215

Gamma Distribution Test

k star (bias corrected)	6.484	Data Distribution	
Theta Star	2182	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	14151		
MLE of Standard Deviation	5557		
nu star	181.6		
Approximate Chi Square Value (.05)	151.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	16780
Adjusted Chi Square Value	147.7	95% Jackknife UCL	16981

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.688	95% Standard Bootstrap UCL	16693
Anderson-Darling 5% Critical Value	0.736	95% Bootstrap-t UCL	18885
Kolmogorov-Smirnov Test Statistic	0.196	95% Hall's Bootstrap UCL	29134
Kolmogorov-Smirnov 5% Critical Value	0.229	95% Percentile Bootstrap UCL	16949
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	18052
		95% Chebyshev(Mean, Sd) UCL	21117
		97.5% Chebyshev(Mean, Sd) UCL	24132
		99% Chebyshev(Mean, Sd) UCL	30053

Assuming Gamma Distribution

95% Approximate Gamma UCL	16971
95% Adjusted Gamma UCL	17390

Potential UCL to Use

Use 95% Approximate Gamma UCL	16971
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	11
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Raw Statistics

Minimum	199.6	Log-transformed Statistics	
Maximum	1550	Minimum of Log Data	5.296
Mean	547.7	Maximum of Log Data	7.346
Median	546.9	Mean of log Data	6.152
SD	356.5	SD of log Data	0.553
Coefficient of Variation	0.651		
Skewness	1.973		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.772	Shapiro Wilk Test Statistic	0.93
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	716.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	754.3
95% Adjusted-CLT UCL (Chen-1995)	758.1	95% Chebyshev (MVUE) UCL	900.7
95% Modified-t UCL (Johnson-1978)	724.8	97.5% Chebyshev (MVUE) UCL	1056
		99% Chebyshev (MVUE) UCL	1362

Gamma Distribution Test

k star (bias corrected)	2.73	Data Distribution	
Theta Star	200.6	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	547.7		
MLE of Standard Deviation	331.5		
nu star	76.45		
Approximate Chi Square Value (.05)	57.31	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	704.5
Adjusted Chi Square Value	55.11	95% Jackknife UCL	716.5

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.664	95% Standard Bootstrap UCL	699.7
Anderson-Darling 5% Critical Value	0.742	95% Bootstrap-t UCL	868.9
Kolmogorov-Smirnov Test Statistic	0.214	95% Hall's Bootstrap UCL	1597
Kolmogorov-Smirnov 5% Critical Value	0.23	95% Percentile Bootstrap UCL	714.4
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	757.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	730.7	95% Chebyshev(Mean, Sd) UCL	963.1
95% Adjusted Gamma UCL	759.8	97.5% Chebyshev(Mean, Sd) UCL	1143
		99% Chebyshev(Mean, Sd) UCL	1496

Potential UCL to Use

Use 95% Approximate Gamma UCL	730.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	7
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Raw Statistics

Minimum	0.0201	Log-transformed Statistics	
Maximum	10.68	Minimum of Log Data	-3.907
Mean	7.033	Maximum of Log Data	2.368
Median	8.281	Mean of log Data	0.984
SD	4.022	SD of log Data	2.388
Coefficient of Variation	0.572		
Skewness	-1.147		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.746	Shapiro Wilk Test Statistic	0.59
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.936	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1731
95% Adjusted-CLT UCL (Chen-1995)	8.449	95% Chebyshev (MVUE) UCL	109.6
95% Modified-t UCL (Johnson-1978)	8.881	97.5% Chebyshev (MVUE) UCL	145.4
		99% Chebyshev (MVUE) UCL	215.7

Gamma Distribution Test

k star (bias corrected)	0.546	Data Distribution	
Theta Star	12.89	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.033		
MLE of Standard Deviation	9.52		
nu star	15.28		
Approximate Chi Square Value (.05)	7.456	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	8.801
Adjusted Chi Square Value	6.742	95% Jackknife UCL	8.936
		95% Standard Bootstrap UCL	8.717
Anderson-Darling Test Statistic	2.928	95% Bootstrap-t UCL	8.574
Anderson-Darling 5% Critical Value	0.781	95% Hall's Bootstrap UCL	8.455
Kolmogorov-Smirnov Test Statistic	0.45	95% Percentile Bootstrap UCL	8.655
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	8.458
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.72
		97.5% Chebyshev(Mean, Sd) UCL	13.75
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.73
95% Approximate Gamma UCL	14.41		
95% Adjusted Gamma UCL	15.94		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	17.73
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	6
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Raw Statistics

Minimum	-0.00794
Maximum	1.1
Mean	0.219
Median	0.219
SD	0.273
Coefficient of Variation	1.247
Skewness	2.821

Log-transformed Statistics
Log Statistics Not Available

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.576
Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level	

Lognormal Distribution Test
Not Available

Assuming Normal Distribution

95% Student's-t UCL	0.348
Assuming Normal Distribution	
95% Student's-t UCL	0.348

Assuming Lognormal Distribution

95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen 1995)	0.398
95% Modified-t UCL (Johnson-1978)	0.358

Gamma Distribution Test

Gamma Statistics Not Available

Data Distribution
Data do not follow a Discernable Distribution (0.05)

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.537
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95% CLT UCL	0.339
95% Jackknife UCL	0.348
95% Standard Bootstrap UCL	0.33
95% Bootstrap-t UCL	0.447
95% Hall's Bootstrap UCL	0.855
95% Percentile Bootstrap UCL	0.345
95% BCA Bootstrap UCL	0.392
95% Chebyshev(Mean, Sd) UCL	0.537
97.5% Chebyshev(Mean, Sd) UCL	0.675
99% Chebyshev(Mean, Sd) UCL	0.946

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	11
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Raw Statistics

Minimum	11.2	Log-transformed Statistics	
Maximum	648	Minimum of Log Data	2.416
Mean	168.5	Maximum of Log Data	6.474
Median	141.8	Mean of log Data	4.806
SD	152.9	SD of log Data	0.907
Coefficient of Variation	0.907		
Skewness	2.607		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.71	Shapiro Wilk Test Statistic	0.895
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	240.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	358.5
95% Adjusted-CLT UCL (Chen-1995)	266.1	95% Chebyshev (MVUE) UCL	379
95% Modified-t UCL (Johnson-1978)	245.6	97.5% Chebyshev (MVUE) UCL	466.3
		99% Chebyshev (MVUE) UCL	637.6

Gamma Distribution Test

k star (bias corrected)	1.386	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	121.6		
MLE of Mean	168.5		
MLE of Standard Deviation	143.1		
nu star	38.81		
Approximate Chi Square Value (.05)	25.54	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	235.7
Adjusted Chi Square Value	24.12	95% Jackknife UCL	240.9

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.515	95% Standard Bootstrap UCL	236
Anderson-Darling 5% Critical Value	0.749	95% Bootstrap-t UCL	316.4
Kolmogorov-Smirnov Test Statistic	0.184	95% Hall's Bootstrap UCL	529.9
Kolmogorov-Smirnov 5% Critical Value	0.232	95% Percentile Bootstrap UCL	239.2
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	270.9
		95% Chebyshev(Mean, Sd) UCL	346.6
		97.5% Chebyshev(Mean, Sd) UCL	423.7
		99% Chebyshev(Mean, Sd) UCL	575.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	256
95% Adjusted Gamma UCL	271.1

Potential UCL to Use

Use 95% Approximate Gamma UCL	256
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	7
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.044	Minimum of Log Data	-3.124
Maximum	13.95	Maximum of Log Data	2.635
Mean	7.929	Mean of log Data	1.429
Median	8.964	SD of log Data	1.944
SD	4.005		
Coefficient of Variation	0.505		
Skewness	-1.036		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.852	Shapiro Wilk Test Statistic	0.545
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.824	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	323.9
95% Adjusted-CLT UCL (Chen-1995)	9.373	95% Chebyshev (MVUE) UCL	73.11
95% Modified-t UCL (Johnson-1978)	9.775	97.5% Chebyshev (MVUE) UCL	95.86
		99% Chebyshev (MVUE) UCL	140.6

Gamma Distribution Test

k star (bias corrected)	0.763	Data Distribution	
Theta Star	10.39	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.929		
MLE of Standard Deviation	9.077		
nu star	21.37		
Approximate Chi Square Value (.05)	11.87	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	9.689
Adjusted Chi Square Value	10.93	95% Jackknife UCL	9.824

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.711	95% Standard Bootstrap UCL	9.637
Anderson-Darling 5% Critical Value	0.764	95% Bootstrap-t UCL	9.48
Kolmogorov-Smirnov Test Statistic	0.424	95% Hall's Bootstrap UCL	9.457
Kolmogorov-Smirnov 5% Critical Value	0.236	95% Percentile Bootstrap UCL	9.53
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.263

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.28	95% Chebyshev(Mean, Sd) UCL	12.59
95% Adjusted Gamma UCL	15.49	97.5% Chebyshev(Mean, Sd) UCL	14.61
		99% Chebyshev(Mean, Sd) UCL	18.58

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	18.58
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.201	Log-transformed Statistics	
Maximum	18.7	Minimum of Log Data	-1.604
Mean	5.155	Maximum of Log Data	2.929
Median	5.155	Mean of log Data	1.24
SD	4.341	SD of log Data	1.133
Coefficient of Variation	0.842		
Skewness	2.418		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.609	Shapiro Wilk Test Statistic	0.714
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	7.209	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16.95
95% Adjusted-CLT UCL (Chen-1995)	7.864	95% Chebyshev (MVUE) UCL	15.05
95% Modified-t UCL (Johnson-1978)	7.334	97.5% Chebyshev (MVUE) UCL	18.9
		99% Chebyshev (MVUE) UCL	26.48

Gamma Distribution Test

k star (bias corrected)	1.143	Data Distribution	
Theta Star	4.51	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	5.155		
MLE of Standard Deviation	4.822		
nu star	32		
Approximate Chi Square Value (.05)	20.07	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	7.063
Adjusted Chi Square Value	18.83	95% Jackknife UCL	7.209

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.064	95% Standard Bootstrap UCL	6.976
Anderson-Darling 5% Critical Value	0.753	95% Bootstrap-t UCL	8.26
Kolmogorov-Smirnov Test Statistic	0.398	95% Hall's Bootstrap UCL	16.14
Kolmogorov-Smirnov 5% Critical Value	0.233	95% Percentile Bootstrap UCL	7.35
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	7.736

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.218	95% Chebyshev(Mean, Sd) UCL	10.21
95% Adjusted Gamma UCL	8.762	97.5% Chebyshev(Mean, Sd) UCL	12.4
		99% Chebyshev(Mean, Sd) UCL	16.7

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	10.21
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.0078	Log-transformed Statistics	
Maximum	0.49	Minimum of Log Data	-4.854
Mean	0.247	Maximum of Log Data	-0.713
Median	0.247	Mean of log Data	-1.697
SD	0.126	SD of log Data	1.1
Coefficient of Variation	0.511		
Skewness	0.00488		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.751	Shapiro Wilk Test Statistic	0.595
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.307
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.303
95% Modified-t UCL (Johnson-1978)	0.307

Assuming Lognormal Distribution

95% H-UCL	0.829
95% Chebyshev (MVUE) UCL	0.759
97.5% Chebyshev (MVUE) UCL	0.95
99% Chebyshev (MVUE) UCL	1.327

Gamma Distribution Test

k star (bias corrected)	1.473
Theta Star	0.168
MLE of Mean	0.247
MLE of Standard Deviation	0.204
nu star	41.24
Approximate Chi Square Value (.05)	27.52
Adjusted Level of Significance	0.0312
Adjusted Chi Square Value	26.04

Data Distribution
Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	2.507
Anderson-Darling 5% Critical Value	0.748
Kolmogorov-Smirnov Test Statistic	0.456
Kolmogorov-Smirnov 5% Critical Value	0.232
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	0.303
95% Jackknife UCL	0.307
95% Standard Bootstrap UCL	0.301
95% Bootstrap-t UCL	0.309
95% Hall's Bootstrap UCL	0.317
95% Percentile Bootstrap UCL	0.297
95% BCA Bootstrap UCL	0.297
95% Chebyshev(Mean, Sd) UCL	0.395
97.5% Chebyshev(Mean, Sd) UCL	0.458
99% Chebyshev(Mean, Sd) UCL	0.584

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.371
95% Adjusted Gamma UCL	0.392

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.395

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	8
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Raw Statistics

Minimum	0.475	Log-transformed Statistics	
Maximum	22.94	Minimum of Log Data	-0.744
Mean	14.28	Maximum of Log Data	3.133
Median	14.28	Mean of log Data	2.387
SD	6.792	SD of log Data	1.04
Coefficient of Variation	0.476		
Skewness	-0.836		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.899	Shapiro Wilk Test Statistic	0.669
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	17.49	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	42.65
95% Adjusted-CLT UCL (Chen-1995)	16.83	95% Chebyshev (MVUE) UCL	41.1
95% Modified-t UCL (Johnson-1978)	17.43	97.5% Chebyshev (MVUE) UCL	51.22
		99% Chebyshev (MVUE) UCL	71.1

Gamma Distribution Test

k star (bias corrected)	1.612	Data Distribution	
Theta Star	8.858	Data appear Normal at 5% Significance Level	
MLE of Mean	14.28		
MLE of Standard Deviation	11.25		
nu star	45.14		
Approximate Chi Square Value (.05)	30.72	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	17.26
Adjusted Chi Square Value	29.15	95% Jackknife UCL	17.49

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.356	95% Standard Bootstrap UCL	17.14
Anderson-Darling 5% Critical Value	0.746	95% Bootstrap-t UCL	16.96
Kolmogorov-Smirnov Test Statistic	0.308	95% Hall's Bootstrap UCL	16.77
Kolmogorov-Smirnov 5% Critical Value	0.232	95% Percentile Bootstrap UCL	17.01
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	16.91

Assuming Gamma Distribution

95% Approximate Gamma UCL	20.98	95% Chebyshev(Mean, Sd) UCL	22.19
95% Adjusted Gamma UCL	22.11	97.5% Chebyshev(Mean, Sd) UCL	25.61
		99% Chebyshev(Mean, Sd) UCL	32.34

Potential UCL to Use

Use 95% Student's-t UCL	17.49
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.00141	Log-transformed Statistics	
Maximum	0.19	Minimum of Log Data	-6.564
Mean	0.0766	Maximum of Log Data	-1.661
Median	0.0766	Mean of log Data	-2.831
SD	0.0385	SD of log Data	1.11
Coefficient of Variation	0.503		
Skewness	1.593		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.473
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0948
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.0982
95% Modified-t UCL (Johnson-1978)	0.0956

Assuming Lognormal Distribution

95% H-UCL	0.273
95% Chebyshev (MVUE) UCL	0.248
97.5% Chebyshev (MVUE) UCL	0.31
99% Chebyshev (MVUE) UCL	0.434

Gamma Distribution Test

k star (bias corrected)	1.665
Theta Star	0.046
MLE of Mean	0.0766
MLE of Standard Deviation	0.0594
nu star	46.63
Approximate Chi Square Value (.05)	31.96
Adjusted Level of Significance	0.0312
Adjusted Chi Square Value	30.35

Data Distribution
Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	2.958
Anderson-Darling 5% Critical Value	0.746
Kolmogorov-Smirnov Test Statistic	0.378
Kolmogorov-Smirnov 5% Critical Value	0.232
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	0.0935
95% Jackknife UCL	0.0948
95% Standard Bootstrap UCL	0.0927
95% Bootstrap-t UCL	0.0988
95% Hall's Bootstrap UCL	0.2
95% Percentile Bootstrap UCL	0.0928
95% BCA Bootstrap UCL	0.0982
95% Chebyshev(Mean, Sd) UCL	0.121
97.5% Chebyshev(Mean, Sd) UCL	0.141
99% Chebyshev(Mean, Sd) UCL	0.179

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.112
95% Adjusted Gamma UCL	0.118

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.121
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.159	Log-transformed Statistics	
Maximum	6.14	Minimum of Log Data	-1.839
Mean	2.185	Maximum of Log Data	1.815
Median	2.185	Mean of log Data	0.584
SD	1.291	SD of log Data	0.79
Coefficient of Variation	0.591		
Skewness	2.156		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.636	Shapiro Wilk Test Statistic	0.635
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.796	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4.203
95% Adjusted-CLT UCL (Chen-1995)	2.964	95% Chebyshev (MVUE) UCL	4.71
95% Modified-t UCL (Johnson-1978)	2.829	97.5% Chebyshev (MVUE) UCL	5.717
		99% Chebyshev (MVUE) UCL	7.695

Gamma Distribution Test

k star (bias corrected)	2.157	Data Distribution	
Theta Star	1.013	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.185		
MLE of Standard Deviation	1.488		
nu star	60.39		
Approximate Chi Square Value (.05)	43.52	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	2.752
Adjusted Chi Square Value	41.62	95% Jackknife UCL	2.796

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.201	95% Standard Bootstrap UCL	2.731
Anderson-Darling 5% Critical Value	0.744	95% Bootstrap-t UCL	3.031
Kolmogorov-Smirnov Test Statistic	0.367	95% Hall's Bootstrap UCL	5.725
Kolmogorov-Smirnov 5% Critical Value	0.231	95% Percentile Bootstrap UCL	2.757
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	2.953

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.032	95% Chebyshev(Mean, Sd) UCL	3.688
95% Adjusted Gamma UCL	3.17	97.5% Chebyshev(Mean, Sd) UCL	4.339
		99% Chebyshev(Mean, Sd) UCL	5.617

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	3.688
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-02.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	12
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Raw Statistics

Minimum	6.38	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.853
Mean	9.151	Maximum of Log Data	2.398
Median	9.151	Mean of log Data	2.199
SD	1.581	SD of log Data	0.179
Coefficient of Variation	0.173		
Skewness	-0.226		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.87	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.988
95% Adjusted-CLT UCL (Chen-1995)	9.797	95% Chebyshev (MVUE) UCL	11.01
95% Modified-t UCL (Johnson-1978)	9.866	97.5% Chebyshev (MVUE) UCL	11.81
		99% Chebyshev (MVUE) UCL	13.39

Gamma Distribution Test

k star (bias corrected)	27.51	Data Distribution	
Theta Star	0.333	Data appear Normal at 5% Significance Level	
MLE of Mean	9.151		
MLE of Standard Deviation	1.745		
nu star	825.2		
Approximate Chi Square Value (.05)	759.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	9.822
Adjusted Chi Square Value	751.7	95% Jackknife UCL	9.87
		95% Standard Bootstrap UCL	9.803
Anderson-Darling Test Statistic	0.485	95% Bootstrap-t UCL	9.834
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	9.767
Kolmogorov-Smirnov Test Statistic	0.176	95% Percentile Bootstrap UCL	9.779
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	9.772
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.93
		97.5% Chebyshev(Mean, Sd) UCL	11.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.21
95% Approximate Gamma UCL	9.942		
95% Adjusted Gamma UCL	10.04		
Potential UCL to Use		Use 95% Student's-t UCL	9.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	11
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Raw Statistics

Minimum	11	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.398
Mean	52	Maximum of Log Data	4.443
Median	40.33	Mean of log Data	3.785
SD	27.39	SD of log Data	0.648
Coefficient of Variation	0.527		
Skewness	0.119		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.857	Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	64.46	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	80.08
95% Adjusted-CLT UCL (Chen-1995)	63.86	95% Chebyshev (MVUE) UCL	94.28
95% Modified-t UCL (Johnson-1978)	64.49	97.5% Chebyshev (MVUE) UCL	112
		99% Chebyshev (MVUE) UCL	146.7

Gamma Distribution Test

k star (bias corrected)	2.57	Data Distribution	
Theta Star	20.23	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	52		
MLE of Standard Deviation	32.44	Nonparametric Statistics	
nu star	77.1	95% CLT UCL	63.63
Approximate Chi Square Value (.05)	57.87	95% Jackknife UCL	64.46
Adjusted Level of Significance	0.0324	95% Standard Bootstrap UCL	63.17
Adjusted Chi Square Value	55.82	95% Bootstrap-t UCL	63.96
		95% Hall's Bootstrap UCL	62.52
Anderson-Darling Test Statistic	0.724	95% Percentile Bootstrap UCL	63.06
Anderson-Darling 5% Critical Value	0.744	95% BCA Bootstrap UCL	62.8
Kolmogorov-Smirnov Test Statistic	0.204	95% Chebyshev(Mean, Sd) UCL	82.83
Kolmogorov-Smirnov 5% Critical Value	0.223	97.5% Chebyshev(Mean, Sd) UCL	96.17
Data appear Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	122.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	69.27		
95% Adjusted Gamma UCL	71.81		

Potential UCL to Use		Use 95% Approximate Gamma UCL	69.27
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	15
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Raw Statistics

Minimum	228.7	Log-transformed Statistics	
Maximum	1762	Minimum of Log Data	5.432
Mean	496.3	Maximum of Log Data	7.474
Median	431.7	Mean of log Data	6.062
SD	369.9	SD of log Data	0.496
Coefficient of Variation	0.745		
Skewness	3.2		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.593	Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	664.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	637.9
95% Adjusted-CLT UCL (Chen-1995)	737.8	95% Chebyshev (MVUE) UCL	757.3
95% Modified-t UCL (Johnson-1978)	677.7	97.5% Chebyshev (MVUE) UCL	876.9
		99% Chebyshev (MVUE) UCL	1112

Gamma Distribution Test

k star (bias corrected)	2.919	Data Distribution	
Theta Star	170	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	496.3		
MLE of Standard Deviation	290.5		
nu star	87.57		
Approximate Chi Square Value (.05)	66.99	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	653.4
Adjusted Chi Square Value	64.78	95% Jackknife UCL	664.5

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.982	95% Standard Bootstrap UCL	649.3
Anderson-Darling 5% Critical Value	0.742	95% Bootstrap-t UCL	885.6
Kolmogorov-Smirnov Test Statistic	0.206	95% Hall's Bootstrap UCL	1294
Kolmogorov-Smirnov 5% Critical Value	0.223	95% Percentile Bootstrap UCL	668.1
Data follow Appr. Gamma Distribution at 5% Significance Level		95% BCA Bootstrap UCL	763.7
		95% Chebyshev(Mean, Sd) UCL	912.6
		97.5% Chebyshev(Mean, Sd) UCL	1093
		99% Chebyshev(Mean, Sd) UCL	1447

Assuming Gamma Distribution

95% Approximate Gamma UCL	648.7
95% Adjusted Gamma UCL	670.9

Potential UCL to Use

Use 95% Approximate Gamma UCL	648.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.0489	Log-transformed Statistics	
Maximum	11.88	Minimum of Log Data	-3.018
Mean	8.723	Maximum of Log Data	2.475
Median	10	Mean of log Data	1.689
SD	3.543	SD of log Data	1.648
Coefficient of Variation	0.406		
Skewness	-2.256		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.454
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	116.7
95% Adjusted-CLT UCL (Chen-1995)	9.659	95% Chebyshev (MVUE) UCL	55.29
95% Modified-t UCL (Johnson-1978)	10.25	97.5% Chebyshev (MVUE) UCL	71.57
		99% Chebyshev (MVUE) UCL	103.6

Gamma Distribution Test

k star (bias corrected)	0.995	Data Distribution	
Theta Star	8.768	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.723		
MLE of Standard Deviation	8.746		
nu star	29.85		
Approximate Chi Square Value (.05)	18.37	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.23
Adjusted Chi Square Value	17.27	95% Jackknife UCL	10.33
		95% Standard Bootstrap UCL	10.19
Anderson-Darling Test Statistic	4.381	95% Bootstrap-t UCL	9.943
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	9.739
Kolmogorov-Smirnov Test Statistic	0.488	95% Percentile Bootstrap UCL	10.04
Kolmogorov-Smirnov 5% Critical Value	0.227	95% BCA Bootstrap UCL	9.915
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.71
		97.5% Chebyshev(Mean, Sd) UCL	14.44
		99% Chebyshev(Mean, Sd) UCL	17.83

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.17		
95% Adjusted Gamma UCL	15.08		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	17.83
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.015	Minimum of Log Data	-4.2
Maximum	0.11	Maximum of Log Data	-2.207
Mean	0.05	Mean of log Data	-3.07
Median	0.05	SD of log Data	0.42
SD	0.0197		
Coefficient of Variation	0.395		
Skewness	1.69		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.638
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.059
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.0608
95% Modified-t UCL (Johnson-1978)	0.0593

Assuming Lognormal Distribution

95% H-UCL	0.0634
95% Chebyshev (MVUE) UCL	0.0747
97.5% Chebyshev (MVUE) UCL	0.0853
99% Chebyshev (MVUE) UCL	0.106

Gamma Distribution Test

k star (bias corrected)	5.586
Theta Star	0.00895
MLE of Mean	0.05
MLE of Standard Deviation	0.0212
nu star	167.6
Approximate Chi Square Value (.05)	138.7
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	135.4

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	2.966
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.417
Kolmogorov-Smirnov 5% Critical Value	0.222
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	0.0584
95% Jackknife UCL	0.059
95% Standard Bootstrap UCL	0.0579
95% Bootstrap-t UCL	0.0613
95% Hall's Bootstrap UCL	0.108
95% Percentile Bootstrap UCL	0.058
95% BCA Bootstrap UCL	0.0603
95% Chebyshev(Mean, Sd) UCL	0.0722
97.5% Chebyshev(Mean, Sd) UCL	0.0818
99% Chebyshev(Mean, Sd) UCL	0.101

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0604
95% Adjusted Gamma UCL	0.0619

Potential UCL to Use

Use 95% Student's-t UCL	0.059
or 95% Modified-t UCL	0.0593

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	15
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Raw Statistics

Minimum	43.2	Log-transformed Statistics	
Maximum	809.8	Minimum of Log Data	3.766
Mean	206.3	Maximum of Log Data	6.697
Median	142.4	Mean of log Data	4.992
SD	201.7	SD of log Data	0.821
Coefficient of Variation	0.978		
Skewness	2.215		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.746	Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	298	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	355.1
95% Adjusted-CLT UCL (Chen-1995)	323.8	95% Chebyshev (MVUE) UCL	398.9
95% Modified-t UCL (Johnson-1978)	303	97.5% Chebyshev (MVUE) UCL	484.7
		99% Chebyshev (MVUE) UCL	653.2

Gamma Distribution Test

k star (bias corrected)	1.349	Data Distribution	
Theta Star	152.9	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	206.3		
MLE of Standard Deviation	177.6		
nu star	40.47		
Approximate Chi Square Value (.05)	26.89	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	292
Adjusted Chi Square Value	25.54	95% Jackknife UCL	298

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.405	95% Standard Bootstrap UCL	289.7
Anderson-Darling 5% Critical Value	0.752	95% Bootstrap-t UCL	388
Kolmogorov-Smirnov Test Statistic	0.149	95% Hall's Bootstrap UCL	665.7
Kolmogorov-Smirnov 5% Critical Value	0.225	95% Percentile Bootstrap UCL	294.5
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	328.4
		95% Chebyshev(Mean, Sd) UCL	433.3
		97.5% Chebyshev(Mean, Sd) UCL	531.6
		99% Chebyshev(Mean, Sd) UCL	724.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	310.4
95% Adjusted Gamma UCL	327

Potential UCL to Use

Use 95% Approximate Gamma UCL	310.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	0.0638	Minimum of Log Data	-2.752
Maximum	0.497	Maximum of Log Data	-0.7
Mean	0.21	Mean of log Data	-1.657
Median	0.21	SD of log Data	0.482
SD	0.0939		
Coefficient of Variation	0.447		
Skewness	1.762		

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 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

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 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.623
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.253	Assuming Lognormal Distribution	95% H-UCL	0.279
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		0.331
95% Adjusted-CLT UCL (Chen-1995)	0.262	97.5% Chebyshev (MVUE) UCL		0.382
95% Modified-t UCL (Johnson-1978)	0.254	99% Chebyshev (MVUE) UCL		0.483

Gamma Distribution Test

k star (bias corrected)	4.342	Data Distribution	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.0483		
MLE of Mean	0.21		
MLE of Standard Deviation	0.101		
nu star	130.3		
Approximate Chi Square Value (.05)	104.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.25
Adjusted Chi Square Value	102.1	95% Jackknife UCL	0.253
		95% Standard Bootstrap UCL	0.25
		95% Bootstrap-t UCL	0.265
		95% Hall's Bootstrap UCL	0.481
		95% Percentile Bootstrap UCL	0.248
		95% BCA Bootstrap UCL	0.267
		95% Chebyshev(Mean, Sd) UCL	0.316
		97.5% Chebyshev(Mean, Sd) UCL	0.361
		99% Chebyshev(Mean, Sd) UCL	0.451

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.068		
Anderson-Darling 5% Critical Value	0.738		
Kolmogorov-Smirnov Test Statistic	0.424		
Kolmogorov-Smirnov 5% Critical Value	0.222		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.261		
95% Adjusted Gamma UCL	0.268		

Potential UCL to Use

		Use 95% Student's-t UCL	0.253
		or 95% Modified-t UCL	0.254

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	11
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Raw Statistics

Minimum	8.45	Log-transformed Statistics	
Maximum	114	Minimum of Log Data	2.134
Mean	26.7	Maximum of Log Data	4.736
Median	20	Mean of log Data	3
SD	27.3	SD of log Data	0.701
Coefficient of Variation	1.022		
Skewness	2.756		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	39.12	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	39.56
95% Adjusted-CLT UCL (Chen-1995)	43.65	95% Chebyshev (MVUE) UCL	46.12
95% Modified-t UCL (Johnson-1978)	39.95	97.5% Chebyshev (MVUE) UCL	55.18
		99% Chebyshev (MVUE) UCL	72.97

Gamma Distribution Test

k star (bias corrected)	1.57	Data Distribution	
Theta Star	17.01	Data appear Lognormal at 5% Significance Level	
MLE of Mean	26.7		
MLE of Standard Deviation	21.31		
nu star	47.09		
Approximate Chi Square Value (.05)	32.34	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	38.29
Adjusted Chi Square Value	30.84	95% Jackknife UCL	39.12
		95% Standard Bootstrap UCL	37.92
		95% Bootstrap-t UCL	69.27
		95% Hall's Bootstrap UCL	100.2
		95% Percentile Bootstrap UCL	38.96
		95% BCA Bootstrap UCL	43.26
		95% Chebyshev(Mean, Sd) UCL	57.42
		97.5% Chebyshev(Mean, Sd) UCL	70.72
		99% Chebyshev(Mean, Sd) UCL	96.83

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.748		
Kolmogorov-Smirnov Test Statistic	0.286		
Kolmogorov-Smirnov 5% Critical Value	0.225		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	38.88		
95% Adjusted Gamma UCL	40.77		

Potential UCL to Use

Use 95% H-UCL	39.56
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ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	1.01	Minimum of Log Data	0.00995
Maximum	2.06	Maximum of Log Data	0.723
Mean	1.483	Mean of log Data	0.386
Median	1.483	SD of log Data	0.136
SD	0.201		
Coefficient of Variation	0.136		
Skewness	0.855		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.583	Shapiro Wilk Test Statistic	0.589
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.575
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.581
95% Modified-t UCL (Johnson-1978)	1.577

Assuming Lognormal Distribution

95% H-UCL	1.583
95% Chebyshev (MVUE) UCL	1.711
97.5% Chebyshev (MVUE) UCL	1.81
99% Chebyshev (MVUE) UCL	2.004

Gamma Distribution Test

k star (bias corrected)	47
Theta Star	0.0316
MLE of Mean	1.483
MLE of Standard Deviation	0.216
nu star	1410
Approximate Chi Square Value (.05)	1324
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	1314

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	3.265
Anderson-Darling 5% Critical Value	0.734
Kolmogorov-Smirnov Test Statistic	0.416
Kolmogorov-Smirnov 5% Critical Value	0.221
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics	
95% CLT UCL	1.569
95% Jackknife UCL	1.575
95% Standard Bootstrap UCL	1.568
95% Bootstrap-t UCL	1.579
95% Hall's Bootstrap UCL	1.66
95% Percentile Bootstrap UCL	1.567
95% BCA Bootstrap UCL	1.567
95% Chebyshev(Mean, Sd) UCL	1.71
97.5% Chebyshev(Mean, Sd) UCL	1.808
99% Chebyshev(Mean, Sd) UCL	2

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.58
95% Adjusted Gamma UCL	1.592

Potential UCL to Use

Use 95% Student's-t UCL	1.575
or 95% Modified-t UCL	1.577

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-03.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	8
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Raw Statistics

Minimum	5.2	Log-transformed Statistics	
Maximum	11.06	Minimum of Log Data	1.649
Mean	9.514	Maximum of Log Data	2.403
Median	11	Mean of log Data	2.227
SD	2.044	SD of log Data	0.245
Coefficient of Variation	0.215		
Skewness	-0.941		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.751	Shapiro Wilk Test Statistic	0.748
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.44	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.78
95% Adjusted-CLT UCL (Chen-1995)	10.24	95% Chebyshev (MVUE) UCL	12.18
95% Modified-t UCL (Johnson-1978)	10.42	97.5% Chebyshev (MVUE) UCL	13.33
		99% Chebyshev (MVUE) UCL	15.57

Gamma Distribution Test

k star (bias corrected)	15.83	Data Distribution	
Theta Star	0.601	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.514		
MLE of Standard Deviation	2.392		
nu star	474.8		
Approximate Chi Square Value (.05)	425.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.38
Adjusted Chi Square Value	419.5	95% Jackknife UCL	10.44
		95% Standard Bootstrap UCL	10.37
Anderson-Darling Test Statistic	1.762	95% Bootstrap-t UCL	10.38
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	10.23
Kolmogorov-Smirnov Test Statistic	0.369	95% Percentile Bootstrap UCL	10.3
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	10.26
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.81
		97.5% Chebyshev(Mean, Sd) UCL	12.81
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.76
95% Approximate Gamma UCL	10.62		
95% Adjusted Gamma UCL	10.77		

Potential UCL to Use

Use 95% Student's-t UCL	10.44
or 95% Modified-t UCL	10.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	10
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Raw Statistics

Minimum	9.7	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.272
Mean	57.82	Maximum of Log Data	4.443
Median	64.67	Mean of log Data	3.903
SD	27	SD of log Data	0.652
Coefficient of Variation	0.467		
Skewness	-0.379		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.86	Shapiro Wilk Test Statistic	0.818
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	70.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	90.66
95% Adjusted-CLT UCL (Chen-1995)	68.56	95% Chebyshev (MVUE) UCL	106.7
95% Modified-t UCL (Johnson-1978)	69.99	97.5% Chebyshev (MVUE) UCL	126.7
		99% Chebyshev (MVUE) UCL	166.2

Gamma Distribution Test

k star (bias corrected)	2.764	Data Distribution	
Theta Star	20.92	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	57.82		
MLE of Standard Deviation	34.78		
nu star	82.93		
Approximate Chi Square Value (.05)	62.94	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	69.29
Adjusted Chi Square Value	60.8	95% Jackknife UCL	70.1
		95% Standard Bootstrap UCL	68.89
Anderson-Darling Test Statistic	0.88	95% Bootstrap-t UCL	69.2
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	68.06
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	68.35
Kolmogorov-Smirnov 5% Critical Value	0.223	95% BCA Bootstrap UCL	67.28
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	88.21
		97.5% Chebyshev(Mean, Sd) UCL	101.4
		99% Chebyshev(Mean, Sd) UCL	127.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	76.18
95% Adjusted Gamma UCL	78.87

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	88.21
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	7
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Raw Statistics

Minimum	7.2	Log-transformed Statistics	
Maximum	239.6	Minimum of Log Data	1.974
Mean	50.45	Maximum of Log Data	5.479
Median	35	Mean of log Data	3.542
SD	59.87	SD of log Data	0.827
Coefficient of Variation	1.187		
Skewness	2.762		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.55	Shapiro Wilk Test Statistic	0.818
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	77.68	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	84.16
95% Adjusted-CLT UCL (Chen-1995)	87.65	95% Chebyshev (MVUE) UCL	94.3
95% Modified-t UCL (Johnson-1978)	79.51	97.5% Chebyshev (MVUE) UCL	114.7
		99% Chebyshev (MVUE) UCL	154.7

Gamma Distribution Test

k star (bias corrected)	1.214	Data Distribution	
Theta Star	41.56	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	50.45		
MLE of Standard Deviation	45.79		
nu star	36.42		
Approximate Chi Square Value (.05)	23.61	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	75.88
Adjusted Chi Square Value	22.34	95% Jackknife UCL	77.68
		95% Standard Bootstrap UCL	75.44
Anderson-Darling Test Statistic	1.987	95% Bootstrap-t UCL	184.5
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	279
Kolmogorov-Smirnov Test Statistic	0.419	95% Percentile Bootstrap UCL	77.73
Kolmogorov-Smirnov 5% Critical Value	0.226	95% BCA Bootstrap UCL	88.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	117.8
		97.5% Chebyshev(Mean, Sd) UCL	147
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	204.2
95% Approximate Gamma UCL	77.83		
95% Adjusted Gamma UCL	82.24		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 117.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.0071	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.948
Mean	9.11	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.792
SD	2.662	SD of log Data	1.867
Coefficient of Variation	0.292		
Skewness	-3.321		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.394	Shapiro Wilk Test Statistic	0.307
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.32	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	294.4
95% Adjusted-CLT UCL (Chen-1995)	9.611	95% Chebyshev (MVUE) UCL	91.33
95% Modified-t UCL (Johnson-1978)	10.22	97.5% Chebyshev (MVUE) UCL	119.3
		99% Chebyshev (MVUE) UCL	174.2

Gamma Distribution Test

k star (bias corrected)	1.117	Data Distribution	
Theta Star	8.16	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.11		
MLE of Standard Deviation	8.622		
nu star	33.5		
Approximate Chi Square Value (.05)	21.26	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.24
Adjusted Chi Square Value	20.07	95% Jackknife UCL	10.32

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	5.174	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.522	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.226	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	12.11
		97.5% Chebyshev(Mean, Sd) UCL	13.4
		99% Chebyshev(Mean, Sd) UCL	15.95

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.35
95% Adjusted Gamma UCL	15.21

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 99% Chebyshev (Mean, Sd) UCL	15.95
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics			
Number of Valid Observations	15	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	7.6	Minimum of Log Data	2.028
Maximum	631	Maximum of Log Data	6.447
Mean	151	Mean of log Data	4.582
Median	65	SD of log Data	1.019
SD	160		
Coefficient of Variation	1.06		
Skewness	2.235		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.712	Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	223.7	95% H-UCL	349.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	352.7
95% Adjusted-CLT UCL (Chen-1995)	244.4	97.5% Chebyshev (MVUE) UCL	437.7
95% Modified-t UCL (Johnson-1978)	227.7	99% Chebyshev (MVUE) UCL	604.5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.077	Data appear Lognormal at 5% Significance Level	
Theta Star	140.2		
MLE of Mean	151		
MLE of Standard Deviation	145.5		
nu star	32.3		
Approximate Chi Square Value (.05)	20.31	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	218.9
Adjusted Chi Square Value	19.14	95% Jackknife UCL	223.7
		95% Standard Bootstrap UCL	216.3
Anderson-Darling Test Statistic	0.883	95% Bootstrap-t UCL	292.3
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	454.3
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL	223.8
Kolmogorov-Smirnov 5% Critical Value	0.227	95% BCA Bootstrap UCL	239.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	331.1
		97.5% Chebyshev(Mean, Sd) UCL	409
		99% Chebyshev(Mean, Sd) UCL	562.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	240.1		
95% Adjusted Gamma UCL	254.7		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	331.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.041	Log-transformed Statistics	
Maximum	13.32	Minimum of Log Data	-3.194
Mean	9.523	Maximum of Log Data	2.589
Median	10	Mean of log Data	1.952
SD	2.764	SD of log Data	1.426
Coefficient of Variation	0.29		
Skewness	-3.109		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.458	Shapiro Wilk Test Statistic	0.315
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.78	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	73.11
95% Adjusted-CLT UCL (Chen-1995)	10.08	95% Chebyshev (MVUE) UCL	48.83
95% Modified-t UCL (Johnson-1978)	10.68	97.5% Chebyshev (MVUE) UCL	62.47
		99% Chebyshev (MVUE) UCL	89.27

Gamma Distribution Test

k star (bias corrected)	1.488	Data Distribution	
Theta Star	6.399	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.523		
MLE of Standard Deviation	7.806		
nu star	44.64		
Approximate Chi Square Value (.05)	30.32	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.7
Adjusted Chi Square Value	28.87	95% Jackknife UCL	10.78
		95% Standard Bootstrap UCL	10.66
Anderson-Darling Test Statistic	4.967	95% Bootstrap-t UCL	10.37
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	10.24
Kolmogorov-Smirnov Test Statistic	0.537	95% Percentile Bootstrap UCL	10.43
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	10.21
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.63
		97.5% Chebyshev(Mean, Sd) UCL	13.98
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.62
95% Approximate Gamma UCL	14.02		
95% Adjusted Gamma UCL	14.73		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 12.63

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.012	Log-transformed Statistics	
Maximum	0.118	Minimum of Log Data	-4.423
Mean	0.065	Maximum of Log Data	-2.136
Median	0.065	Mean of log Data	-2.806
SD	0.02	SD of log Data	0.473
Coefficient of Variation	0.308		
Skewness	-1.1E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.443
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0742	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0875
95% Adjusted-CLT UCL (Chen-1995)	0.0736	95% Chebyshev (MVUE) UCL	0.104
95% Modified-t UCL (Johnson-1978)	0.0742	97.5% Chebyshev (MVUE) UCL	0.12
		99% Chebyshev (MVUE) UCL	0.151

Gamma Distribution Test

k star (bias corrected)	5.66	Data Distribution	
Theta Star	0.0115	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.065		
MLE of Standard Deviation	0.0273		
nu star	169.8		
Approximate Chi Square Value (.05)	140.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.0736
Adjusted Chi Square Value	137.4	95% Jackknife UCL	0.0742

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	3.972	95% Standard Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.738	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.484	95% Hall's Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level	0.222	95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0785	95% Chebyshev(Mean, Sd) UCL	0.0876
95% Adjusted Gamma UCL	0.0804	97.5% Chebyshev(Mean, Sd) UCL	0.0974
		99% Chebyshev(Mean, Sd) UCL	0.117

Potential UCL to Use

Use 95% Student's-t UCL	0.0742
or 95% Modified-t UCL	0.0742

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	10
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Raw Statistics

Minimum	6.4	Log-transformed Statistics	
Maximum	28.18	Minimum of Log Data	1.856
Mean	15.65	Maximum of Log Data	3.339
Median	17.11	Mean of log Data	2.66
SD	6.359	SD of log Data	0.461
Coefficient of Variation	0.406		
Skewness	0.046		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	18.54	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	20.4
95% Adjusted-CLT UCL (Chen-1995)	18.37	95% Chebyshev (MVUE) UCL	24.16
95% Modified-t UCL (Johnson-1978)	18.54	97.5% Chebyshev (MVUE) UCL	27.79
		99% Chebyshev (MVUE) UCL	34.92

Gamma Distribution Test

k star (bias corrected)	4.598	Data Distribution	
Theta Star	3.404	Data appear Normal at 5% Significance Level	
MLE of Mean	15.65		
MLE of Standard Deviation	7.298		
nu star	137.9		
Approximate Chi Square Value (.05)	111.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	18.35
Adjusted Chi Square Value	108.9	95% Jackknife UCL	18.54
		95% Standard Bootstrap UCL	18.23
Anderson-Darling Test Statistic	0.811	95% Bootstrap-t UCL	18.58
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	18.24
Kolmogorov-Smirnov Test Statistic	0.239	95% Percentile Bootstrap UCL	18.24
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	18.39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.81
		97.5% Chebyshev(Mean, Sd) UCL	25.9
		99% Chebyshev(Mean, Sd) UCL	31.99

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.31
95% Adjusted Gamma UCL	19.82

Potential UCL to Use

Use 95% Student's-t UCL	18.54
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	1.01	Log-transformed Statistics	
Maximum	1.57	Minimum of Log Data	0.00995
Mean	1.29	Maximum of Log Data	0.451
Median	1.29	Mean of log Data	0.251
SD	0.106	SD of log Data	0.0838
Coefficient of Variation	0.082		
Skewness	7.24E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.525
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.338
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	1.335
95% Modified-t UCL (Johnson-1978)	1.338

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	1.412
97.5% Chebyshev (MVUE) UCL	1.465
99% Chebyshev (MVUE) UCL	1.568

Gamma Distribution Test

k star (bias corrected)	124.5
Theta Star	0.0104
MLE of Mean	1.29
MLE of Standard Deviation	0.116
nu star	3735
Approximate Chi Square Value (.05)	3594
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	3577

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.335
95% Jackknife UCL	1.338
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	1.409
97.5% Chebyshev(Mean, Sd) UCL	1.461
99% Chebyshev(Mean, Sd) UCL	1.562

Anderson-Darling Test Statistic	3.812
Anderson-Darling 5% Critical Value	0.734
Kolmogorov-Smirnov Test Statistic	0.444
Kolmogorov-Smirnov 5% Critical Value	0.221

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.341
95% Adjusted Gamma UCL	1.347

Potential UCL to Use

Use 95% Student's-t UCL	1.338
or 95% Modified-t UCL	1.338

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-04.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	10
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Raw Statistics

Minimum	4.5	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.504
Mean	8.368	Maximum of Log Data	2.398
Median	8.368	Mean of log Data	2.087
SD	2.267	SD of log Data	0.289
Coefficient of Variation	0.271		
Skewness	-0.104		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.895	Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.399	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9.715
95% Adjusted-CLT UCL (Chen-1995)	9.314	95% Chebyshev (MVUE) UCL	11.14
95% Modified-t UCL (Johnson-1978)	9.397	97.5% Chebyshev (MVUE) UCL	12.33
		99% Chebyshev (MVUE) UCL	14.67

Gamma Distribution Test

k star (bias corrected)	10.93	Data Distribution	
Theta Star	0.766	Data appear Normal at 5% Significance Level	
MLE of Mean	8.368		
MLE of Standard Deviation	2.531		
nu star	327.8		
Approximate Chi Square Value (.05)	286.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	9.331
Adjusted Chi Square Value	282.2	95% Jackknife UCL	9.399
		95% Standard Bootstrap UCL	9.273

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.564	95% Bootstrap-t UCL	9.353
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	9.286
Kolmogorov-Smirnov Test Statistic	0.207	95% Percentile Bootstrap UCL	9.266
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	9.274
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.92
		97.5% Chebyshev(Mean, Sd) UCL	12.02
		99% Chebyshev(Mean, Sd) UCL	14.19

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.563		
95% Adjusted Gamma UCL	9.723		
Potential UCL to Use		Use 95% Student's-t UCL	9.399

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.39	Minimum of Log Data	-0.942
Maximum	0.965	Maximum of Log Data	-0.0356
Mean	0.678	Mean of log Data	-0.403
Median	0.678	SD of log Data	0.175
SD	0.109		
Coefficient of Variation	0.16		
Skewness	-3.3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.509
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.727	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.738
95% Adjusted-CLT UCL (Chen-1995)	0.724	95% Chebyshev (MVUE) UCL	0.812
95% Modified-t UCL (Johnson-1978)	0.727	97.5% Chebyshev (MVUE) UCL	0.87
		99% Chebyshev (MVUE) UCL	0.984

Gamma Distribution Test

k star (bias corrected)	30.4	Data Distribution	
Theta Star	0.0223	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.678		
MLE of Standard Deviation	0.123		
nu star	911.9		
Approximate Chi Square Value (.05)	842.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.724
Adjusted Chi Square Value	834.6	95% Jackknife UCL	0.727

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.834	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.455	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.8
		97.5% Chebyshev(Mean, Sd) UCL	0.853
		99% Chebyshev(Mean, Sd) UCL	0.957

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.733
95% Adjusted Gamma UCL	0.74

Potential UCL to Use

Use 95% Student's-t UCL	0.727
or 95% Modified-t UCL	0.727

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.47	Minimum of Log Data	-0.755
Maximum	1.67	Maximum of Log Data	0.513
Mean	1.07	Mean of log Data	0.0425
Median	1.07	SD of log Data	0.249
SD	0.227		
Coefficient of Variation	0.212		
Skewness	-1.8E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.493
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.173	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1.216
95% Adjusted-CLT UCL (Chen-1995)	1.166	95% Chebyshev (MVUE) UCL	1.377
95% Modified-t UCL (Johnson-1978)	1.173	97.5% Chebyshev (MVUE) UCL	1.508
		99% Chebyshev (MVUE) UCL	1.765

Gamma Distribution Test

k star (bias corrected)	16.07	Data Distribution	
Theta Star	0.0666	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.07		
MLE of Standard Deviation	0.267		
nu star	482.1		
Approximate Chi Square Value (.05)	432.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	1.166
Adjusted Chi Square Value	426.4	95% Jackknife UCL	1.173

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.86	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.463	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	1.325
		97.5% Chebyshev(Mean, Sd) UCL	1.436
		99% Chebyshev(Mean, Sd) UCL	1.653

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.194
95% Adjusted Gamma UCL	1.21

Potential UCL to Use

Use 95% Student's-t UCL	1.173
or 95% Modified-t UCL	1.173

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	10
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Raw Statistics

Minimum	13	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.565
Mean	57.21	Maximum of Log Data	4.443
Median	57.21	Mean of log Data	3.942
SD	23.7	SD of log Data	0.518
Coefficient of Variation	0.414		
Skewness	-0.113		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.892	Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	67.99	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	78.69
95% Adjusted-CLT UCL (Chen-1995)	67.09	95% Chebyshev (MVUE) UCL	93.46
95% Modified-t UCL (Johnson-1978)	67.96	97.5% Chebyshev (MVUE) UCL	108.7
		99% Chebyshev (MVUE) UCL	138.5

Gamma Distribution Test

k star (bias corrected)	3.999	Data Distribution	
Theta Star	14.31	Data appear Normal at 5% Significance Level	

MLE of Mean	57.21	Nonparametric Statistics	
MLE of Standard Deviation	28.61	95% CLT UCL	67.28
nu star	120	95% Jackknife UCL	67.99
Approximate Chi Square Value (.05)	95.66	95% Standard Bootstrap UCL	67.15
Adjusted Level of Significance	0.0324	95% Bootstrap-t UCL	67.81
Adjusted Chi Square Value	93	95% Hall's Bootstrap UCL	66.96

Anderson-Darling Test Statistic	0.596	95% Percentile Bootstrap UCL	66.52
Anderson-Darling 5% Critical Value	0.739	95% BCA Bootstrap UCL	66.65
Kolmogorov-Smirnov Test Statistic	0.195	95% Chebyshev(Mean, Sd) UCL	83.89
Kolmogorov-Smirnov 5% Critical Value	0.222	97.5% Chebyshev(Mean, Sd) UCL	95.43
Data appear Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	118.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	71.74		
95% Adjusted Gamma UCL	73.8		

Potential UCL to Use		Use 95% Student's-t UCL	67.99
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	9.6	Minimum of Log Data	2.262
Maximum	242.7	Maximum of Log Data	5.492
Mean	48.01	Mean of log Data	3.592
Median	35	SD of log Data	0.679
SD	54.88		
Coefficient of Variation	1.143		
Skewness	3.62		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.451	Shapiro Wilk Test Statistic	0.77
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	72.97	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	69.15
95% Adjusted-CLT UCL (Chen-1995)	85.47	95% Chebyshev (MVUE) UCL	80.98
95% Modified-t UCL (Johnson-1978)	75.18	97.5% Chebyshev (MVUE) UCL	96.6
		99% Chebyshev (MVUE) UCL	127.3

Gamma Distribution Test

k star (bias corrected)	1.597	Data Distribution	
Theta Star	30.06	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	48.01		
MLE of Standard Deviation	37.99		
nu star	47.91		
Approximate Chi Square Value (.05)	33.03	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	71.32
Adjusted Chi Square Value	31.51	95% Jackknife UCL	72.97
		95% Standard Bootstrap UCL	70.75
Anderson-Darling Test Statistic	2.146	95% Bootstrap-t UCL	143.9
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	189.7
Kolmogorov-Smirnov Test Statistic	0.338	95% Percentile Bootstrap UCL	75.19
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	90.87
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	109.8
		97.5% Chebyshev(Mean, Sd) UCL	136.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	189
95% Approximate Gamma UCL	69.65		
95% Adjusted Gamma UCL	73		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 109.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	14
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Raw Statistics

Minimum	7280	Log-transformed Statistics	
Maximum	30200	Minimum of Log Data	8.893
Mean	13783	Maximum of Log Data	10.32
Median	12992	Mean of log Data	9.463
SD	5834	SD of log Data	0.367
Coefficient of Variation	0.423		
Skewness	1.795		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.835	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16436	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	16652
95% Adjusted-CLT UCL (Chen-1995)	17006	95% Chebyshev (MVUE) UCL	19458
95% Modified-t UCL (Johnson-1978)	16552	97.5% Chebyshev (MVUE) UCL	21946
		99% Chebyshev (MVUE) UCL	26834

Gamma Distribution Test

k star (bias corrected)	6.06	Data Distribution	
Theta Star	2274	Data appear Gamma Distributed at 5% Significance Level	

MLE of Mean

MLE of Mean	13783
MLE of Standard Deviation	5599
nu star	181.8

Approximate Chi Square Value (.05)

Approximate Chi Square Value (.05)	151.6
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	148.2

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.421
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.163
Kolmogorov-Smirnov 5% Critical Value	0.222

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	16527
95% Adjusted Gamma UCL	16905

Potential UCL to Use

Use 95% Approximate Gamma UCL	16527
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	14
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Raw Statistics

Minimum	115.3	Log-transformed Statistics	
Maximum	1528	Minimum of Log Data	4.748
Mean	424.8	Maximum of Log Data	7.332
Median	363.3	Mean of log Data	5.87
SD	336	SD of log Data	0.577
Coefficient of Variation	0.791		
Skewness	2.857		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.649	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	577.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	583.4
95% Adjusted-CLT UCL (Chen-1995)	635.9	95% Chebyshev (MVUE) UCL	692.1
95% Modified-t UCL (Johnson-1978)	588.3	97.5% Chebyshev (MVUE) UCL	812.7
		99% Chebyshev (MVUE) UCL	1050

Gamma Distribution Test

k star (bias corrected)	2.373	Data Distribution	
Theta Star	179.1	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	424.8		
MLE of Standard Deviation	275.8		
nu star	71.18		
Approximate Chi Square Value (.05)	52.75	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	567.6
Adjusted Chi Square Value	50.8	95% Jackknife UCL	577.7
		95% Standard Bootstrap UCL	564.7
Anderson-Darling Test Statistic	0.945	95% Bootstrap-t UCL	818.5
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	1264
Kolmogorov-Smirnov Test Statistic	0.222	95% Percentile Bootstrap UCL	583
Kolmogorov-Smirnov 5% Critical Value	0.223	95% BCA Bootstrap UCL	642.9
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	803
		97.5% Chebyshev(Mean, Sd) UCL	966.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1288
95% Approximate Gamma UCL	573.2		
95% Adjusted Gamma UCL	595.2		

Potential UCL to Use		Use 95% Approximate Gamma UCL	573.2
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.0379	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.273
Mean	8.444	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.55
SD	3.453	SD of log Data	1.912
Coefficient of Variation	0.409		
Skewness	-2.295		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.501	Shapiro Wilk Test Statistic	0.434
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.01	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	276.6
95% Adjusted-CLT UCL (Chen-1995)	9.346	95% Chebyshev (MVUE) UCL	77.91
95% Modified-t UCL (Johnson-1978)	9.927	97.5% Chebyshev (MVUE) UCL	101.9
		99% Chebyshev (MVUE) UCL	149.1

Gamma Distribution Test

k star (bias corrected)	0.837	Data Distribution	
Theta Star	10.09	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.444		
MLE of Standard Deviation	9.23		
nu star	25.11		
Approximate Chi Square Value (.05)	14.69	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	9.911
Adjusted Chi Square Value	13.72	95% Jackknife UCL	10.01
		95% Standard Bootstrap UCL	9.853
Anderson-Darling Test Statistic	4.578	95% Bootstrap-t UCL	9.589
Anderson-Darling 5% Critical Value	0.763	95% Hall's Bootstrap UCL	9.495
Kolmogorov-Smirnov Test Statistic	0.499	95% Percentile Bootstrap UCL	9.772
Kolmogorov-Smirnov 5% Critical Value	0.228	95% BCA Bootstrap UCL	9.502
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.33
		97.5% Chebyshev(Mean, Sd) UCL	14.01
		99% Chebyshev(Mean, Sd) UCL	17.32

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.43
95% Adjusted Gamma UCL	15.45

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 99% Chebyshev (Mean, Sd) UCL	17.32
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

15

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	11
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Raw Statistics

Minimum	57.82	Log-transformed Statistics	
Maximum	587.2	Minimum of Log Data	4.057
Mean	135.5	Maximum of Log Data	6.375
Median	112.2	Mean of log Data	4.693
SD	129.9	SD of log Data	0.591
Coefficient of Variation	0.959		
Skewness	3.382		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.526	Shapiro Wilk Test Statistic	0.81
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	194.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	183.1
95% Adjusted-CLT UCL (Chen-1995)	222	95% Chebyshev (MVUE) UCL	217
95% Modified-t UCL (Johnson-1978)	199.5	97.5% Chebyshev (MVUE) UCL	255.4
		99% Chebyshev (MVUE) UCL	330.9

Gamma Distribution Test

k star (bias corrected)	2.02	Data Distribution	
Theta Star	67.07	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	135.5		
MLE of Standard Deviation	95.32		
nu star	60.6		
Approximate Chi Square Value (.05)	43.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	190.7
Adjusted Chi Square Value	41.93	95% Jackknife UCL	194.6
		95% Standard Bootstrap UCL	187.6
Anderson-Darling Test Statistic	1.375	95% Bootstrap-t UCL	289.8
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	405.5
Kolmogorov-Smirnov Test Statistic	0.267	95% Percentile Bootstrap UCL	200.5
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	228.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	281.7
		97.5% Chebyshev(Mean, Sd) UCL	345
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	469.3
95% Approximate Gamma UCL	187.9		
95% Adjusted Gamma UCL	195.8		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	281.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.18	Log-transformed Statistics	
Maximum	12.25	Minimum of Log Data	-1.715
Mean	9.497	Maximum of Log Data	2.506
Median	10	Mean of log Data	2.048
SD	2.663	SD of log Data	1.043
Coefficient of Variation	0.28		
Skewness	-3.418		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.472	Shapiro Wilk Test Statistic	0.328
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.71	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	29.24
95% Adjusted-CLT UCL (Chen-1995)	9.979	95% Chebyshev (MVUE) UCL	29.03
95% Modified-t UCL (Johnson-1978)	10.61	97.5% Chebyshev (MVUE) UCL	36.11
		99% Chebyshev (MVUE) UCL	50

Gamma Distribution Test

k star (bias corrected)	2.138	Data Distribution	
Theta Star	4.442	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.497		
MLE of Standard Deviation	6.495		
nu star	64.14		
Approximate Chi Square Value (.05)	46.72	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	10.63
Adjusted Chi Square Value	44.89	95% Jackknife UCL	10.71
		95% Standard Bootstrap UCL	10.6
Anderson-Darling Test Statistic	4.633	95% Bootstrap-t UCL	10.36
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	10.16
Kolmogorov-Smirnov Test Statistic	0.516	95% Percentile Bootstrap UCL	10.36
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	10.22
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.49
		97.5% Chebyshev(Mean, Sd) UCL	13.79
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.34
95% Approximate Gamma UCL	13.04		
95% Adjusted Gamma UCL	13.57		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	12.49
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	7.41	Minimum of Log Data	2.003
Maximum	48.82	Maximum of Log Data	3.888
Mean	18.27	Mean of log Data	2.802
Median	18.8	SD of log Data	0.459
SD	9.678		
Coefficient of Variation	0.53		
Skewness	2.301		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.705	Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	22.67	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	23.47
95% Adjusted-CLT UCL (Chen-1995)	23.96	95% Chebyshev (MVUE) UCL	27.79
95% Modified-t UCL (Johnson-1978)	22.92	97.5% Chebyshev (MVUE) UCL	31.96
		99% Chebyshev (MVUE) UCL	40.14

Gamma Distribution Test

k star (bias corrected)	4.038	Data Distribution	
Theta Star	4.524	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	18.27		
MLE of Standard Deviation	9.091		
nu star	121.1		
Approximate Chi Square Value (.05)	96.72	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	22.38
Adjusted Chi Square Value	94.03	95% Jackknife UCL	22.67
		95% Standard Bootstrap UCL	22.3
Anderson-Darling Test Statistic	1.106	95% Bootstrap-t UCL	24.73
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	42.18
Kolmogorov-Smirnov Test Statistic	0.295	95% Percentile Bootstrap UCL	22.6
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	23.99
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29.16
		97.5% Chebyshev(Mean, Sd) UCL	33.87
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	43.13
95% Approximate Gamma UCL	22.88		
95% Adjusted Gamma UCL	23.53		

Potential UCL to Use

Use 95% Student's-t UCL	22.67
or 95% Modified-t UCL	22.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	18.5	Minimum of Log Data	2.918
Maximum	62.5	Maximum of Log Data	4.135
Mean	40.5	Mean of log Data	3.678
Median	40.5	SD of log Data	0.238
SD	8.315		
Coefficient of Variation	0.205		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.495
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	44.28	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	45.75
95% Adjusted-CLT UCL (Chen-1995)	44.03	95% Chebyshev (MVUE) UCL	51.59
95% Modified-t UCL (Johnson-1978)	44.28	97.5% Chebyshev (MVUE) UCL	56.34
		99% Chebyshev (MVUE) UCL	65.66

Gamma Distribution Test

k star (bias corrected)	17.34	Data Distribution	
Theta Star	2.336	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	40.5		
MLE of Standard Deviation	9.727		
nu star	520.1		
Approximate Chi Square Value (.05)	468.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	44.03
Adjusted Chi Square Value	462.1	95% Jackknife UCL	44.28

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.856	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.735	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.462	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	49.86
		97.5% Chebyshev(Mean, Sd) UCL	53.91
		99% Chebyshev(Mean, Sd) UCL	61.86

Assuming Gamma Distribution

95% Approximate Gamma UCL	44.99
95% Adjusted Gamma UCL	45.58

Potential UCL to Use

Use 95% Student's-t UCL	44.28
or 95% Modified-t UCL	44.28

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-05.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.17	Log-transformed Statistics	
Maximum	0.96	Minimum of Log Data	-1.772
Mean	0.565	Maximum of Log Data	-0.0408
Median	0.565	Mean of log Data	-0.632
SD	0.177	SD of log Data	0.41
Coefficient of Variation	0.313		
Skewness	3.5E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic	0.559
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.662
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.653
95% Modified-t UCL (Johnson-1978)	0.662

Assuming Lognormal Distribution

95% H-UCL	0.756
95% Chebyshev (MVUE) UCL	0.887
97.5% Chebyshev (MVUE) UCL	1.023
99% Chebyshev (MVUE) UCL	1.29

Gamma Distribution Test

k star (bias corrected)	6.141
Theta Star	0.092
MLE of Mean	0.565
MLE of Standard Deviation	0.228
nu star	135.1
Approximate Chi Square Value (.05)	109.3
Adjusted Level of Significance	0.0278
Adjusted Chi Square Value	105.5

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.653
95% Jackknife UCL	0.662
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.797
97.5% Chebyshev(Mean, Sd) UCL	0.898
99% Chebyshev(Mean, Sd) UCL	1.095

Anderson-Darling Test Statistic	2.465
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.455
Kolmogorov-Smirnov 5% Critical Value	0.256
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.699
95% Adjusted Gamma UCL	0.724

Potential UCL to Use

Use 95% Student's-t UCL	0.662
or 95% Modified-t UCL	0.662

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	8
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Raw Statistics

Minimum	5.4	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.686
Mean	8.992	Maximum of Log Data	2.398
Median	8.992	Mean of log Data	2.176
SD	1.78	SD of log Data	0.216
Coefficient of Variation	0.198		
Skewness	-0.568		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.965	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.26
95% Adjusted-CLT UCL (Chen-1995)	9.777	95% Chebyshev (MVUE) UCL	11.58
95% Modified-t UCL (Johnson-1978)	9.95	97.5% Chebyshev (MVUE) UCL	12.69
		99% Chebyshev (MVUE) UCL	14.87

Gamma Distribution Test

k star (bias corrected)	18.4	Data Distribution	
Theta Star	0.489	Data appear Normal at 5% Significance Level	
MLE of Mean	8.992		
MLE of Standard Deviation	2.096		
nu star	404.8		
Approximate Chi Square Value (.05)	359.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	9.875
Adjusted Chi Square Value	352.2	95% Jackknife UCL	9.965
		95% Standard Bootstrap UCL	9.819
Anderson-Darling Test Statistic	0.436	95% Bootstrap-t UCL	9.905
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	9.819
Kolmogorov-Smirnov Test Statistic	0.156	95% Percentile Bootstrap UCL	9.822
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	9.732
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.33
		97.5% Chebyshev(Mean, Sd) UCL	12.34
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.33
95% Approximate Gamma UCL	10.13		
95% Adjusted Gamma UCL	10.34		

Potential UCL to Use		Use 95% Student's-t UCL	9.965
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	3
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Raw Statistics

Minimum	68	Log-transformed Statistics	
Maximum	180	Minimum of Log Data	4.22
Mean	124	Maximum of Log Data	5.193
Median	124	Mean of log Data	4.8
SD	25.04	SD of log Data	0.223
Coefficient of Variation	0.202		
Skewness	0		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic	0.6
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	137.7	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	142.1
95% Adjusted-CLT UCL (Chen-1995)	136.4	95% Chebyshev (MVUE) UCL	160.7
95% Modified-t UCL (Johnson-1978)	137.7	97.5% Chebyshev (MVUE) UCL	176.5
		99% Chebyshev (MVUE) UCL	207.5

Gamma Distribution Test

k star (bias corrected)	17.72	Data Distribution	
Theta Star	6.999	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	124		
MLE of Standard Deviation	29.46		
nu star	389.8		
Approximate Chi Square Value (.05)	345	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	136.4
Adjusted Chi Square Value	338.1	95% Jackknife UCL	137.7
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.395	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.436	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	156.9
		97.5% Chebyshev(Mean, Sd) UCL	171.2
		99% Chebyshev(Mean, Sd) UCL	199.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	140.1		
95% Adjusted Gamma UCL	142.9		

Potential UCL to Use

Use 95% Student's-t UCL	137.7
or 95% Modified-t UCL	137.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.34	Log-transformed Statistics	
Maximum	0.92	Minimum of Log Data	-1.079
Mean	0.63	Maximum of Log Data	-0.0834
Median	0.63	Mean of log Data	-0.484
SD	0.13	SD of log Data	0.228
Coefficient of Variation	0.206		
Skewness	7.8E-16		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic	0.599
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.701	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.725
95% Adjusted-CLT UCL (Chen-1995)	0.694	95% Chebyshev (MVUE) UCL	0.821
95% Modified-t UCL (Johnson-1978)	0.701	97.5% Chebyshev (MVUE) UCL	0.903
		99% Chebyshev (MVUE) UCL	1.064

Gamma Distribution Test

k star (bias corrected)	16.98	Data Distribution	
Theta Star	0.0371	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.63		
MLE of Standard Deviation	0.153		
nu star	373.5		
Approximate Chi Square Value (.05)	329.7	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.694
Adjusted Chi Square Value	323	95% Jackknife UCL	0.701
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.397	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.437	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.8
		97.5% Chebyshev(Mean, Sd) UCL	0.874
		99% Chebyshev(Mean, Sd) UCL	1.019

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.714		
95% Adjusted Gamma UCL	0.729		

Potential UCL to Use

Use 95% Student's-t UCL	0.701
or 95% Modified-t UCL	0.701

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	6
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Raw Statistics

Minimum	21	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.045
Mean	63.29	Maximum of Log Data	4.443
Median	63.29	Mean of log Data	4.06
SD	24.02	SD of log Data	0.477
Coefficient of Variation	0.38		
Skewness	-0.601		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.842	Shapiro Wilk Test Statistic	0.822
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	76.42	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	89.72
95% Adjusted-CLT UCL (Chen-1995)	73.81	95% Chebyshev (MVUE) UCL	105.2
95% Modified-t UCL (Johnson-1978)	76.2	97.5% Chebyshev (MVUE) UCL	122.9
		99% Chebyshev (MVUE) UCL	157.8

Gamma Distribution Test

k star (bias corrected)	4.312	Data Distribution	
Theta Star	14.68	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	63.29		
MLE of Standard Deviation	30.48		
nu star	94.86	Nonparametric Statistics	
Approximate Chi Square Value (.05)	73.4	95% CLT UCL	75.21
Adjusted Level of Significance	0.0278	95% Jackknife UCL	76.42
Adjusted Chi Square Value	70.33	95% Standard Bootstrap UCL	74.56
		95% Bootstrap-t UCL	74.87
Anderson-Darling Test Statistic	0.795	95% Hall's Bootstrap UCL	73.25
Anderson-Darling 5% Critical Value	0.731	95% Percentile Bootstrap UCL	74.21
Kolmogorov-Smirnov Test Statistic	0.266	95% BCA Bootstrap UCL	73.06
Kolmogorov-Smirnov 5% Critical Value	0.256	95% Chebyshev(Mean, Sd) UCL	94.87
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	108.5
		99% Chebyshev(Mean, Sd) UCL	135.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	81.8		
95% Adjusted Gamma UCL	85.38		

Potential UCL to Use

Use 95% Student's-t UCL	76.42
or 95% Modified-t UCL	76.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	10
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Raw Statistics

Minimum	6965	Log-transformed Statistics	
Maximum	29000	Minimum of Log Data	8.849
Mean	13620	Maximum of Log Data	10.28
Median	13620	Mean of log Data	9.453
SD	5764	SD of log Data	0.369
Coefficient of Variation	0.423		
Skewness	2.015		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.785	Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	16770	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	17265
95% Adjusted-CLT UCL (Chen-1995)	17607	95% Chebyshev (MVUE) UCL	20201
95% Modified-t UCL (Johnson-1978)	16946	97.5% Chebyshev (MVUE) UCL	23077
		99% Chebyshev (MVUE) UCL	28725

Gamma Distribution Test

k star (bias corrected)	5.676	Data Distribution	
Theta Star	2400	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	13620		
MLE of Standard Deviation	5717		
nu star	124.9		
Approximate Chi Square Value (.05)	100.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	16479
Adjusted Chi Square Value	96.45	95% Jackknife UCL	16770
		95% Standard Bootstrap UCL	16439
Anderson-Darling Test Statistic	0.583	95% Bootstrap-t UCL	18663
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	30426
Kolmogorov-Smirnov Test Statistic	0.218	95% Percentile Bootstrap UCL	16594
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	17762
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21195
		97.5% Chebyshev(Mean, Sd) UCL	24473
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	30912
95% Approximate Gamma UCL	16997		
95% Adjusted Gamma UCL	17634		

Potential UCL to Use		Use 95% Approximate Gamma UCL	16997
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	10
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Raw Statistics

Minimum	192.8	Log-transformed Statistics	
Maximum	992.8	Minimum of Log Data	5.262
Mean	409.5	Maximum of Log Data	6.901
Median	350.3	Mean of log Data	5.907
SD	222.9	SD of log Data	0.471
Coefficient of Variation	0.544		
Skewness	1.942		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	531.3	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	564.7
95% Adjusted-CLT UCL (Chen-1995)	562.1	95% Chebyshev (MVUE) UCL	662.3
95% Modified-t UCL (Johnson-1978)	537.9	97.5% Chebyshev (MVUE) UCL	773.2
		99% Chebyshev (MVUE) UCL	991

Gamma Distribution Test

k star (bias corrected)	3.534	Data Distribution	
Theta Star	115.9	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	409.5		
MLE of Standard Deviation	217.8		
nu star	77.76		
Approximate Chi Square Value (.05)	58.44	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	520.1
Adjusted Chi Square Value	55.72	95% Jackknife UCL	531.3
		95% Standard Bootstrap UCL	512.4
Anderson-Darling Test Statistic	0.402	95% Bootstrap-t UCL	613.5
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	1034
Kolmogorov-Smirnov Test Statistic	0.166	95% Percentile Bootstrap UCL	525.6
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	553.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	702.5
		97.5% Chebyshev(Mean, Sd) UCL	829.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1078
95% Approximate Gamma UCL	544.8		
95% Adjusted Gamma UCL	571.4		

Potential UCL to Use

Use 95% Approximate Gamma UCL	544.8
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.0316	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.455
Mean	8.552	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.718
SD	2.998	SD of log Data	1.719
Coefficient of Variation	0.351		
Skewness	-2.729		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.566	Shapiro Wilk Test Statistic	0.392
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.19	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	284.9
95% Adjusted-CLT UCL (Chen-1995)	9.244	95% Chebyshev (MVUE) UCL	64.76
95% Modified-t UCL (Johnson-1978)	10.07	97.5% Chebyshev (MVUE) UCL	84.6
		99% Chebyshev (MVUE) UCL	123.6

Gamma Distribution Test

k star (bias corrected)	1.012	Data Distribution	
Theta Star	8.452	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.552		
MLE of Standard Deviation	8.502		
nu star	22.26		
Approximate Chi Square Value (.05)	12.53	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	10.04
Adjusted Chi Square Value	11.36	95% Jackknife UCL	10.19
		95% Standard Bootstrap UCL	9.984
		95% Bootstrap-t UCL	9.674
		95% Hall's Bootstrap UCL	9.48
		95% Percentile Bootstrap UCL	9.737
		95% BCA Bootstrap UCL	9.459
		95% Chebyshev(Mean, Sd) UCL	12.49
		97.5% Chebyshev(Mean, Sd) UCL	14.2
		99% Chebyshev(Mean, Sd) UCL	17.55

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.188		
Anderson-Darling 5% Critical Value	0.746		
Kolmogorov-Smirnov Test Statistic	0.436		
Kolmogorov-Smirnov 5% Critical Value	0.261		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.19		
95% Adjusted Gamma UCL	16.76		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	17.55
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	7
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Raw Statistics

Minimum	65	Log-transformed Statistics	
Maximum	220.4	Minimum of Log Data	4.174
Mean	87.22	Maximum of Log Data	5.396
Median	66.43	Mean of log Data	4.391
SD	45.71	SD of log Data	0.365
Coefficient of Variation	0.524		
Skewness	2.944		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.546	Shapiro Wilk Test Statistic	0.658
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	112.2	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	108.9
95% Adjusted-CLT UCL (Chen-1995)	123	95% Chebyshev (MVUE) UCL	127.4
95% Modified-t UCL (Johnson-1978)	114.2	97.5% Chebyshev (MVUE) UCL	145.4
		99% Chebyshev (MVUE) UCL	180.8

Gamma Distribution Test

k star (bias corrected)	4.904	Data Distribution	
Theta Star	17.79	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	87.22		
MLE of Standard Deviation	39.39		
nu star	107.9		
Approximate Chi Square Value (.05)	84.91	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	109.9
Adjusted Chi Square Value	81.59	95% Jackknife UCL	112.2
		95% Standard Bootstrap UCL	108.8
Anderson-Darling Test Statistic	1.69	95% Bootstrap-t UCL	173
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	191.3
Kolmogorov-Smirnov Test Statistic	0.277	95% Percentile Bootstrap UCL	113.1
Kolmogorov-Smirnov 5% Critical Value	0.256	95% BCA Bootstrap UCL	125.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	147.3
		97.5% Chebyshev(Mean, Sd) UCL	173.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	224.3
95% Approximate Gamma UCL	110.8		
95% Adjusted Gamma UCL	115.3		

Potential UCL to Use

Use 95% Student's-t UCL	112.2
or 95% Modified-t UCL	114.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	3
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Raw Statistics

Minimum	18.2	Log-transformed Statistics	
Maximum	37.3	Minimum of Log Data	2.901
Mean	27.75	Maximum of Log Data	3.619
Median	27.75	Mean of log Data	3.312
SD	4.271	SD of log Data	0.162
Coefficient of Variation	0.154		
Skewness	-2E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.627	Shapiro Wilk Test Statistic	0.612
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	30.08	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	30.54
95% Adjusted-CLT UCL (Chen-1995)	29.87	95% Chebyshev (MVUE) UCL	33.71
95% Modified-t UCL (Johnson-1978)	30.08	97.5% Chebyshev (MVUE) UCL	36.28
		99% Chebyshev (MVUE) UCL	41.33

Gamma Distribution Test

k star (bias corrected)	31.91	Data Distribution	
Theta Star	0.87	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	27.75		
MLE of Standard Deviation	4.912		
nu star	702.1		
Approximate Chi Square Value (.05)	641.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	29.87
Adjusted Chi Square Value	632.2	95% Jackknife UCL	30.08
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	2.379	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.429	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	33.36
		97.5% Chebyshev(Mean, Sd) UCL	35.79
		99% Chebyshev(Mean, Sd) UCL	40.56

Assuming Gamma Distribution

95% Approximate Gamma UCL	30.37		
95% Adjusted Gamma UCL	30.82		

Potential UCL to Use

Use 95% Student's-t UCL	30.08
or 95% Modified-t UCL	30.08

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cesium-137

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

Minimum	-0.00601
Maximum	1.61
Mean	0.537
Median	0.537
SD	0.364
Coefficient of Variation	0.679
Skewness	1.717

Log-transformed Statistics
Log Statistics Not Available

Warning: There are only 4 Distinct Values in this data
There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.608		Not Available
Shapiro Wilk Critical Value	0.874		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Student's-t UCL	0.71
Assuming Normal Distribution	
95% Student's-t UCL	0.71

Assuming Lognormal Distribution

	95% H-UCL	N/A
	95% UCLs (Adjusted for Skewness)	
	95% Adjusted-CLT UCL (Chen 1995)	0.745
	95% Modified-t UCL (Johnson-1978)	0.717

Gamma Distribution Test

Gamma Statistics Not Available		Data Distribution	
		Data do not follow a Discernable Distribution (0.05)	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.962	95% CLT UCL	0.697
		95% Jackknife UCL	0.71
		95% Standard Bootstrap UCL	0.696
		95% Bootstrap-t UCL	0.759
		95% Hall's Bootstrap UCL	1.621
		95% Percentile Bootstrap UCL	0.691
		95% BCA Bootstrap UCL	0.729
		95% Chebyshev(Mean, Sd) UCL	0.962
		97.5% Chebyshev(Mean, Sd) UCL	1.145
		99% Chebyshev(Mean, Sd) UCL	1.506

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	5
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Raw Statistics

Minimum	7.67	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.037
Mean	64.69	Maximum of Log Data	4.443
Median	74.85	Mean of log Data	3.986
SD	27.66	SD of log Data	0.775
Coefficient of Variation	0.428		
Skewness	-1.292		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.742	Shapiro Wilk Test Statistic	0.649
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	77.78	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	122.8
95% Adjusted-CLT UCL (Chen-1995)	74.12	95% Chebyshev (MVUE) UCL	138.4
95% Modified-t UCL (Johnson-1978)	77.36	97.5% Chebyshev (MVUE) UCL	167.7
		99% Chebyshev (MVUE) UCL	225.2

Gamma Distribution Test

k star (bias corrected)	2.304	Data Distribution	
Theta Star	28.08	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	64.69		
MLE of Standard Deviation	42.62		
nu star	64.52		
Approximate Chi Square Value (.05)	47.04	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	76.85
Adjusted Chi Square Value	45.06	95% Jackknife UCL	77.78

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.031	95% Standard Bootstrap UCL	76.2
Anderson-Darling 5% Critical Value	0.743	95% Bootstrap-t UCL	75.35
Kolmogorov-Smirnov Test Statistic	0.364	95% Hall's Bootstrap UCL	74.36
Kolmogorov-Smirnov 5% Critical Value	0.231	95% Percentile Bootstrap UCL	75.47
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	73.94
		95% Chebyshev(Mean, Sd) UCL	96.92
		97.5% Chebyshev(Mean, Sd) UCL	110.9
		99% Chebyshev(Mean, Sd) UCL	138.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	88.73
95% Adjusted Gamma UCL	92.62

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	96.92
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	4953	Minimum of Log Data	8.508
Maximum	32605	Maximum of Log Data	10.39
Mean	12544	Mean of log Data	9.349
Median	12083	SD of log Data	0.415
SD	6428		
Coefficient of Variation	0.512		
Skewness	2.553		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Test Statistic	0.703	Shapiro Wilk Critical Value	0.874
Shapiro Wilk Critical Value	0.874		
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	15587	95% H-UCL	15745
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18571
95% Adjusted-CLT UCL (Chen-1995)	16623	97.5% Chebyshev (MVUE) UCL	21226
95% Modified-t UCL (Johnson-1978)	15782	99% Chebyshev (MVUE) UCL	26442
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.614	Data appear Lognormal at 5% Significance Level	
Theta Star	2719		
MLE of Mean	12544		
MLE of Standard Deviation	5840		
nu star	129.2		
Approximate Chi Square Value (.05)	103.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	15370
Adjusted Chi Square Value	100.9	95% Jackknife UCL	15587
		95% Standard Bootstrap UCL	15321
Anderson-Darling Test Statistic	0.953	95% Bootstrap-t UCL	18676
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	29547
Kolmogorov-Smirnov Test Statistic	0.302	95% Percentile Bootstrap UCL	15565
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	16968
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20033
		97.5% Chebyshev(Mean, Sd) UCL	23274
		99% Chebyshev(Mean, Sd) UCL	29639
Assuming Gamma Distribution			
95% Approximate Gamma UCL	15593		
95% Adjusted Gamma UCL	16056		
Potential UCL to Use		Use 95% Student's-t UCL	15587
		or 95% Modified-t UCL	15782
		or 95% H-UCL	15745

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.0277	Log-transformed Statistics	
Maximum	10.68	Minimum of Log Data	-3.586
Mean	8.031	Maximum of Log Data	2.368
Median	9.765	Mean of log Data	1.465
SD	3.508	SD of log Data	1.958
Coefficient of Variation	0.437		
Skewness	-1.974		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.641	Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.691	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	355.4
95% Adjusted-CLT UCL (Chen-1995)	9.044	95% Chebyshev (MVUE) UCL	77.65
95% Modified-t UCL (Johnson-1978)	9.609	97.5% Chebyshev (MVUE) UCL	101.9
		99% Chebyshev (MVUE) UCL	149.4

Gamma Distribution Test

k star (bias corrected)	0.787	Data Distribution	
Theta Star	10.21	Data do not follow a Discernable Distribution (0.05)	

MLE of Mean

MLE of Mean	8.031
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nu star

nu star	22.03
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Approximate Chi Square Value (.05)

Approximate Chi Square Value (.05)	12.36
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Adjusted Level of Significance

Adjusted Level of Significance	0.0312
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Adjusted Chi Square Value

Adjusted Chi Square Value	11.41
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Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.668
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Anderson-Darling 5% Critical Value

Anderson-Darling 5% Critical Value	0.762
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Kolmogorov-Smirnov Test Statistic

Kolmogorov-Smirnov Test Statistic	0.493
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Kolmogorov-Smirnov 5% Critical Value

Kolmogorov-Smirnov 5% Critical Value	0.236
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Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.31
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95% Adjusted Gamma UCL

95% Adjusted Gamma UCL	15.51
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Potential UCL to Use

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	17.36
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Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

Minimum	-0.00393	Log-transformed Statistics	
Maximum	1.1	Log Statistics Not Available	
Mean	0.366		
Median	0.366		
SD	0.249		
Coefficient of Variation	0.682		
Skewness	1.717		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.607	Not Available	
Shapiro Wilk Critical Value	0.874		
Data not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Student's-t UCL	0.484
Assuming Normal Distribution	
95% Student's-t UCL	0.484

Assuming Lognormal Distribution

95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen 1995)	0.508
95% Modified-t UCL (Johnson-1978)	0.489

Gamma Distribution Test

Gamma Statistics Not Available		Data Distribution	
		Data do not follow a Discernable Distribution (0.05)	

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.656	95% CLT UCL	0.475
		95% Jackknife UCL	0.484
		95% Standard Bootstrap UCL	0.472
		95% Bootstrap-t UCL	0.518
		95% Hall's Bootstrap UCL	1.108
		95% Percentile Bootstrap UCL	0.471
		95% BCA Bootstrap UCL	0.497
		95% Chebyshev(Mean, Sd) UCL	0.656
		97.5% Chebyshev(Mean, Sd) UCL	0.782
		99% Chebyshev(Mean, Sd) UCL	1.029

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 10

Raw Statistics

Minimum	6.25	Log-transformed Statistics	
Maximum	648	Minimum of Log Data	1.833
Mean	166.2	Maximum of Log Data	6.474
Median	140.7	Mean of log Data	4.743
SD	154.1	SD of log Data	1.037
Coefficient of Variation	0.927		
Skewness	2.577		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.715	Shapiro Wilk Test Statistic	0.85
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	239.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	446.1
95% Adjusted-CLT UCL (Chen-1995)	264.3	95% Chebyshev (MVUE) UCL	431.1
95% Modified-t UCL (Johnson-1978)	243.9	97.5% Chebyshev (MVUE) UCL	537.1
		99% Chebyshev (MVUE) UCL	745.3

Gamma Distribution Test

k star (bias corrected)	1.222	Data Distribution	
Theta Star	136	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	166.2		
MLE of Standard Deviation	150.3		
nu star	34.23		
Approximate Chi Square Value (.05)	21.85	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	234
Adjusted Chi Square Value	20.54	95% Jackknife UCL	239.1
		95% Standard Bootstrap UCL	230.7
		95% Bootstrap-t UCL	311.5
		95% Hall's Bootstrap UCL	532.6
		95% Percentile Bootstrap UCL	239.2
		95% BCA Bootstrap UCL	271
		95% Chebyshev(Mean, Sd) UCL	345.8
		97.5% Chebyshev(Mean, Sd) UCL	423.4
		99% Chebyshev(Mean, Sd) UCL	576.1

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.542		
Anderson-Darling 5% Critical Value	0.751		
Kolmogorov-Smirnov Test Statistic	0.177		
Kolmogorov-Smirnov 5% Critical Value	0.233		
Data appear Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	260.4		
95% Adjusted Gamma UCL	276.9		

Potential UCL to Use

Use 95% Approximate Gamma UCL 260.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 14 Number of Distinct Observations 5

Raw Statistics

Minimum	0.044	Log-transformed Statistics	
Maximum	13.95	Minimum of Log Data	-3.124
Mean	9.524	Maximum of Log Data	2.635
Median	10	Mean of log Data	1.933
SD	2.962	SD of log Data	1.459
Coefficient of Variation	0.311		
Skewness	-2.624		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.581	Shapiro Wilk Test Statistic	0.349
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.93	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	86.4
95% Adjusted-CLT UCL (Chen-1995)	10.23	95% Chebyshev (MVUE) UCL	51.09
95% Modified-t UCL (Johnson-1978)	10.83	97.5% Chebyshev (MVUE) UCL	65.61
		99% Chebyshev (MVUE) UCL	94.13

Gamma Distribution Test

k star (bias corrected)	1.389	Data Distribution	
Theta Star	6.857	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.524		
MLE of Standard Deviation	8.081		
nu star	38.89		
Approximate Chi Square Value (.05)	25.61	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	10.83
Adjusted Chi Square Value	24.19	95% Jackknife UCL	10.93
		95% Standard Bootstrap UCL	10.78
Anderson-Darling Test Statistic	4.177	95% Bootstrap-t UCL	10.49
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	10.41
Kolmogorov-Smirnov Test Statistic	0.53	95% Percentile Bootstrap UCL	10.61
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	10.43
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.97
		97.5% Chebyshev(Mean, Sd) UCL	14.47
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.4
95% Approximate Gamma UCL	14.47		
95% Adjusted Gamma UCL	15.32		

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 12.97

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thorium-230

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.201	Log-transformed Statistics	
Maximum	18.7	Minimum of Log Data	-1.604
Mean	6.52	Maximum of Log Data	2.929
Median	6.52	Mean of log Data	1.538
SD	4.138	SD of log Data	1.14
Coefficient of Variation	0.635		
Skewness	1.714		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.611	Shapiro Wilk Test Statistic	0.584
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.478	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	23.21
95% Adjusted-CLT UCL (Chen-1995)	8.88	95% Chebyshev (MVUE) UCL	20.47
95% Modified-t UCL (Johnson-1978)	8.563	97.5% Chebyshev (MVUE) UCL	25.73
		99% Chebyshev (MVUE) UCL	36.07

Gamma Distribution Test

k star (bias corrected)	1.328	Data Distribution	
Theta Star	4.908	Data do not follow a Discernable Distribution (0.05)	

MLE of Mean	6.52	Nonparametric Statistics	
MLE of Standard Deviation	5.657	95% CLT UCL	8.339
nu star	37.2	95% Jackknife UCL	8.478
Approximate Chi Square Value (.05)	24.23	95% Standard Bootstrap UCL	8.284
Adjusted Level of Significance	0.0312	95% Bootstrap-t UCL	9.039
Adjusted Chi Square Value	22.85	95% Hall's Bootstrap UCL	18.84
Anderson-Darling Test Statistic	2.893	95% Percentile Bootstrap UCL	8.26
Anderson-Darling 5% Critical Value	0.749	95% BCA Bootstrap UCL	8.292
Kolmogorov-Smirnov Test Statistic	0.461	95% Chebyshev(Mean, Sd) UCL	11.34
Kolmogorov-Smirnov 5% Critical Value	0.232	97.5% Chebyshev(Mean, Sd) UCL	13.43
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	17.52

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.01
95% Adjusted Gamma UCL	10.61

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	11.34
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	0.0318	Minimum of Log Data	-3.447
Maximum	0.49	Maximum of Log Data	-0.713
Mean	0.261	Mean of log Data	-1.449
Median	0.261	SD of log Data	0.599
SD	0.0899		
Coefficient of Variation	0.344		
Skewness	-3.9E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.551	Shapiro Wilk Test Statistic	0.442
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.303	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.405
95% Adjusted-CLT UCL (Chen-1995)	0.3	95% Chebyshev (MVUE) UCL	0.478
95% Modified-t UCL (Johnson-1978)	0.303	97.5% Chebyshev (MVUE) UCL	0.565
		99% Chebyshev (MVUE) UCL	0.735

Gamma Distribution Test

k star (bias corrected)	3.907	Data Distribution	
Theta Star	0.0668	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.261		
MLE of Standard Deviation	0.132		
nu star	109.4		
Approximate Chi Square Value (.05)	86.25	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.3
Adjusted Chi Square Value	83.52	95% Jackknife UCL	0.303
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.667	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.489	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.366
		97.5% Chebyshev(Mean, Sd) UCL	0.411
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.5
95% Approximate Gamma UCL	0.331		
95% Adjusted Gamma UCL	0.342		

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 0.366

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	7
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Raw Statistics

Minimum	0.475	Log-transformed Statistics	
Maximum	22.94	Minimum of Log Data	-0.744
Mean	15.56	Maximum of Log Data	3.133
Median	16.98	Mean of log Data	2.484
SD	6.6	SD of log Data	1.051
Coefficient of Variation	0.424		
Skewness	-1.427		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.812	Shapiro Wilk Test Statistic	0.585
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	18.68	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	48.17
95% Adjusted-CLT UCL (Chen-1995)	17.74	95% Chebyshev (MVUE) UCL	46.02
95% Modified-t UCL (Johnson-1978)	18.57	97.5% Chebyshev (MVUE) UCL	57.41
		99% Chebyshev (MVUE) UCL	79.78

Gamma Distribution Test

k star (bias corrected)	1.677	Data Distribution	
Theta Star	9.278	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	15.56		
MLE of Standard Deviation	12.01		
nu star	46.95		
Approximate Chi Square Value (.05)	32.22	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	18.46
Adjusted Chi Square Value	30.61	95% Jackknife UCL	18.68

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.103	95% Standard Bootstrap UCL	18.4
Anderson-Darling 5% Critical Value	0.746	95% Bootstrap-t UCL	17.97
Kolmogorov-Smirnov Test Statistic	0.378	95% Hall's Bootstrap UCL	17.75
Kolmogorov-Smirnov 5% Critical Value	0.232	95% Percentile Bootstrap UCL	18.2
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	17.78
		95% Chebyshev(Mean, Sd) UCL	23.24
		97.5% Chebyshev(Mean, Sd) UCL	26.57
		99% Chebyshev(Mean, Sd) UCL	33.11

Assuming Gamma Distribution

95% Approximate Gamma UCL	22.66
95% Adjusted Gamma UCL	23.86

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	23.24
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.00141	Log-transformed Statistics	
Maximum	0.19	Minimum of Log Data	-6.564
Mean	0.0811	Maximum of Log Data	-1.661
Median	0.0811	Mean of log Data	-2.772
SD	0.0383	SD of log Data	1.123
Coefficient of Variation	0.472		
Skewness	1.213		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.62	Shapiro Wilk Test Statistic	0.452
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0993	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.299
95% Adjusted-CLT UCL (Chen-1995)	0.102	95% Chebyshev (MVUE) UCL	0.268
95% Modified-t UCL (Johnson-1978)	0.0998	97.5% Chebyshev (MVUE) UCL	0.336
		99% Chebyshev (MVUE) UCL	0.471

Gamma Distribution Test

k star (bias corrected)	1.675	Data Distribution	
Theta Star	0.0484	Data do not follow a Discernable Distribution (0.05)	

MLE of Mean	0.0811	Nonparametric Statistics	
MLE of Standard Deviation	0.0627	95% CLT UCL	0.098
nu star	46.89	95% Jackknife UCL	0.0993
Approximate Chi Square Value (.05)	32.18	95% Standard Bootstrap UCL	0.0974
Adjusted Level of Significance	0.0312	95% Bootstrap-t UCL	0.102
Adjusted Chi Square Value	30.57	95% Hall's Bootstrap UCL	0.135
Anderson-Darling Test Statistic	3.218	95% Percentile Bootstrap UCL	0.0967
Anderson-Darling 5% Critical Value	0.746	95% BCA Bootstrap UCL	0.1
Kolmogorov-Smirnov Test Statistic	0.45	95% Chebyshev(Mean, Sd) UCL	0.126
Kolmogorov-Smirnov 5% Critical Value	0.232	97.5% Chebyshev(Mean, Sd) UCL	0.145
Data not Gamma Distributed at 5% Significance Level		99% Chebyshev(Mean, Sd) UCL	0.183

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.118
95% Adjusted Gamma UCL	0.124

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.126
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.159	Log-transformed Statistics	
Maximum	6.14	Minimum of Log Data	-1.839
Mean	2.456	Maximum of Log Data	1.815
Median	2.456	Mean of log Data	0.709
SD	1.264	SD of log Data	0.81
Coefficient of Variation	0.515		
Skewness	1.564		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.624	Shapiro Wilk Test Statistic	0.565
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3.055	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	4.937
95% Adjusted-CLT UCL (Chen-1995)	3.163	95% Chebyshev (MVUE) UCL	5.487
95% Modified-t UCL (Johnson-1978)	3.078	97.5% Chebyshev (MVUE) UCL	6.675
		99% Chebyshev (MVUE) UCL	9.011

Gamma Distribution Test

k star (bias corrected)	2.243	Data Distribution	
Theta Star	1.095	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.456		
MLE of Standard Deviation	1.64		
nu star	62.82		
Approximate Chi Square Value (.05)	45.58	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	3.012
Adjusted Chi Square Value	43.64	95% Jackknife UCL	3.055
		95% Standard Bootstrap UCL	3.011

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	2.758	95% Bootstrap-t UCL	3.196
Kolmogorov-Smirnov Test Statistic	0.743	95% Hall's Bootstrap UCL	6.352
Kolmogorov-Smirnov 5% Critical Value	0.437	95% Percentile Bootstrap UCL	3.048
Data not Gamma Distributed at 5% Significance Level	0.231	95% BCA Bootstrap UCL	3.082
		95% Chebyshev(Mean, Sd) UCL	3.929
		97.5% Chebyshev(Mean, Sd) UCL	4.566
		99% Chebyshev(Mean, Sd) UCL	5.818

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.385
95% Adjusted Gamma UCL	3.536

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	3.929
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-02.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Beryllium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.45
Maximum	0.67
Mean	0.56
Median	0.56
SD	0.0416
Coefficient of Variation	0.0742
Skewness	-1E-14

Log-transformed Statistics

Minimum of Log Data	-0.799
Maximum of Log Data	-0.4
Mean of log Data	-0.582
SD of log Data	0.0755

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.526
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.579
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.578
95% Modified-t UCL (Johnson-1978)	0.579

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	0.608
97.5% Chebyshev (MVUE) UCL	0.628
99% Chebyshev (MVUE) UCL	0.669

Gamma Distribution Test

k star (bias corrected)	152.7
Theta Star	0.00367
MLE of Mean	0.56
MLE of Standard Deviation	0.0453
nu star	4580
Approximate Chi Square Value (.05)	4424
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	4405

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.578
95% Jackknife UCL	0.579
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.607
97.5% Chebyshev(Mean, Sd) UCL	0.627
99% Chebyshev(Mean, Sd) UCL	0.667

Anderson-Darling Test Statistic	3.81
Anderson-Darling 5% Critical Value	0.734
Kolmogorov-Smirnov Test Statistic	0.443
Kolmogorov-Smirnov 5% Critical Value	0.221
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.58
95% Adjusted Gamma UCL	0.582

Potential UCL to Use

Use 95% Student's-t UCL	0.579
or 95% Modified-t UCL	0.579

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	6
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Raw Statistics

Minimum	14.4	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.667
Mean	70.36	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.133
SD	25.69	SD of log Data	0.601
Coefficient of Variation	0.365		
Skewness	-1.612		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.629	Shapiro Wilk Test Statistic	0.587
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	82.04	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	106.1
95% Adjusted-CLT UCL (Chen-1995)	78.32	95% Chebyshev (MVUE) UCL	125.6
95% Modified-t UCL (Johnson-1978)	81.58	97.5% Chebyshev (MVUE) UCL	148.1
		99% Chebyshev (MVUE) UCL	192.2

Gamma Distribution Test

k star (bias corrected)	3.497	Data Distribution	
Theta Star	20.12	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	70.36		
MLE of Standard Deviation	37.62		
nu star	104.9	Nonparametric Statistics	
Approximate Chi Square Value (.05)	82.27	95% CLT UCL	81.27
Adjusted Level of Significance	0.0324	95% Jackknife UCL	82.04
Adjusted Chi Square Value	79.81	95% Standard Bootstrap UCL	80.77
Anderson-Darling Test Statistic	2.895	95% Bootstrap-t UCL	79.57
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	78.56
Kolmogorov-Smirnov Test Statistic	0.38	95% Percentile Bootstrap UCL	79.83
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	78.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	99.27
		97.5% Chebyshev(Mean, Sd) UCL	111.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	136.4
95% Approximate Gamma UCL	89.72		
95% Adjusted Gamma UCL	92.49		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	99.27
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	15
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Raw Statistics

Minimum	89.24	Log-transformed Statistics	
Maximum	1762	Minimum of Log Data	4.491
Mean	421.2	Maximum of Log Data	7.474
Median	329.9	Mean of log Data	5.816
SD	390	SD of log Data	0.647
Coefficient of Variation	0.926		
Skewness	3.244		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.586	Shapiro Wilk Test Statistic	0.914
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	598.6	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	609.1
95% Adjusted-CLT UCL (Chen-1995)	677	95% Chebyshev (MVUE) UCL	717.2
95% Modified-t UCL (Johnson-1978)	612.7	97.5% Chebyshev (MVUE) UCL	851.5
		99% Chebyshev (MVUE) UCL	1115

Gamma Distribution Test

k star (bias corrected)	1.924	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	219		
MLE of Mean	421.2		
MLE of Standard Deviation	303.7		
nu star	57.72		
Approximate Chi Square Value (.05)	41.25	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	586.9
Adjusted Chi Square Value	39.54	95% Jackknife UCL	598.6

Anderson-Darling Test Statistic	0.929	95% Standard Bootstrap UCL	580.7
Anderson-Darling 5% Critical Value	0.746	95% Bootstrap-t UCL	856.1
Kolmogorov-Smirnov Test Statistic	0.214	95% Hall's Bootstrap UCL	1278
Kolmogorov-Smirnov 5% Critical Value	0.224	95% Percentile Bootstrap UCL	611.3
Data follow Appr. Gamma Distribution at 5% Significance Level		95% BCA Bootstrap UCL	699.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	589.4	95% Chebyshev(Mean, Sd) UCL	860.2
95% Adjusted Gamma UCL	614.9	97.5% Chebyshev(Mean, Sd) UCL	1050
		99% Chebyshev(Mean, Sd) UCL	1423

Potential UCL to Use		Use 95% Approximate Gamma UCL	589.4
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 5

Raw Statistics

Minimum	0.0489	Log-transformed Statistics	
Maximum	11.88	Minimum of Log Data	-3.018
Mean	8.723	Maximum of Log Data	2.475
Median	10	Mean of log Data	1.689
SD	3.543	SD of log Data	1.648
Coefficient of Variation	0.406		
Skewness	-2.256		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.454
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	116.7
95% Adjusted-CLT UCL (Chen-1995)	9.659	95% Chebyshev (MVUE) UCL	55.29
95% Modified-t UCL (Johnson-1978)	10.25	97.5% Chebyshev (MVUE) UCL	71.57
		99% Chebyshev (MVUE) UCL	103.6

Gamma Distribution Test

k star (bias corrected)	0.995	Data Distribution	
Theta Star	8.768	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.723		
MLE of Standard Deviation	8.746		
nu star	29.85	Nonparametric Statistics	
Approximate Chi Square Value (.05)	18.37	95% CLT UCL	10.23
Adjusted Level of Significance	0.0324	95% Jackknife UCL	10.33
Adjusted Chi Square Value	17.27	95% Standard Bootstrap UCL	10.12
Anderson-Darling Test Statistic	4.381	95% Bootstrap-t UCL	9.943
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	9.739
Kolmogorov-Smirnov Test Statistic	0.488	95% Percentile Bootstrap UCL	10.04
Kolmogorov-Smirnov 5% Critical Value	0.227	95% BCA Bootstrap UCL	9.915
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.71
		97.5% Chebyshev(Mean, Sd) UCL	14.44
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.83
95% Approximate Gamma UCL	14.17		
95% Adjusted Gamma UCL	15.08		

Potential UCL to Use

Recommended UCL exceeds the maximum observation Use 99% Chebyshev (Mean, Sd) UCL 17.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.025
Maximum	0.11
Mean	0.0675
Median	0.0675
SD	0.0161
Coefficient of Variation	0.238
Skewness	-4E-15

Log-transformed Statistics

Minimum of Log Data	-3.689
Maximum of Log Data	-2.207
Mean of log Data	-2.729
SD of log Data	0.294

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.482
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0748
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.0743
95% Modified-t UCL (Johnson-1978)	0.0748

Assuming Lognormal Distribution

95% H-UCL	0.079
95% Chebyshev (MVUE) UCL	0.0906
97.5% Chebyshev (MVUE) UCL	0.1
99% Chebyshev (MVUE) UCL	0.12

Gamma Distribution Test

k star (bias corrected)	12.06
Theta Star	0.0056
MLE of Mean	0.0675
MLE of Standard Deviation	0.0194
nu star	361.8
Approximate Chi Square Value (.05)	318.7
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	313.7

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.0743
95% Jackknife UCL	0.0748
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.0856
97.5% Chebyshev(Mean, Sd) UCL	0.0934
99% Chebyshev(Mean, Sd) UCL	0.109

Anderson-Darling Test Statistic	3.88
Anderson-Darling 5% Critical Value	0.736
Kolmogorov-Smirnov Test Statistic	0.468
Kolmogorov-Smirnov 5% Critical Value	0.221
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0766
95% Adjusted Gamma UCL	0.0778

Potential UCL to Use

Use 95% Student's-t UCL	0.0748
or 95% Modified-t UCL	0.0748

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 14

Raw Statistics

Minimum	43.2	Log-transformed Statistics	
Maximum	809.8	Minimum of Log Data	3.766
Mean	206	Maximum of Log Data	6.697
Median	142.4	Mean of log Data	4.989
SD	201.9	SD of log Data	0.825
Coefficient of Variation	0.98		
Skewness	2.211		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.746	Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	297.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	356.1
95% Adjusted-CLT UCL (Chen-1995)	323.6	95% Chebyshev (MVUE) UCL	399.4
95% Modified-t UCL (Johnson-1978)	302.8	97.5% Chebyshev (MVUE) UCL	485.6
		99% Chebyshev (MVUE) UCL	654.8

Gamma Distribution Test

k star (bias corrected)	1.341	Data Distribution	
Theta Star	153.7	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	206		
MLE of Standard Deviation	178		
nu star	40.22		
Approximate Chi Square Value (.05)	26.69	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	291.8
Adjusted Chi Square Value	25.33	95% Jackknife UCL	297.9
		95% Standard Bootstrap UCL	288.9
Anderson-Darling Test Statistic	0.41	95% Bootstrap-t UCL	386.6
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	670.5
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	294
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	334.7
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	433.3
		97.5% Chebyshev(Mean, Sd) UCL	531.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	724.8
95% Approximate Gamma UCL	310.5		
95% Adjusted Gamma UCL	327.1		

Potential UCL to Use

Use 95% Approximate Gamma UCL 310.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations 15 Number of Distinct Observations 3

Raw Statistics

Minimum 0.0638
 Maximum 0.497
 Mean 0.28
 Median 0.28
 SD 0.0818
 Coefficient of Variation 0.292
 Skewness 0

Log-transformed Statistics

Minimum of Log Data -2.752
 Maximum of Log Data -0.7
 Mean of log Data -1.333
 SD of log Data 0.419

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.454
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL 0.317
 95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL (Chen-1995) 0.315
 95% Modified-t UCL (Johnson-1978) 0.317

Assuming Lognormal Distribution

95% H-UCL 0.36
 95% Chebyshev (MVUE) UCL 0.424
 97.5% Chebyshev (MVUE) UCL 0.484
 99% Chebyshev (MVUE) UCL 0.601

Gamma Distribution Test

k star (bias corrected) 6.785
 Theta Star 0.0413
 MLE of Mean 0.28
 MLE of Standard Deviation 0.108
 nu star 203.6
 Approximate Chi Square Value (.05) 171.6
 Adjusted Level of Significance 0.0324
 Adjusted Chi Square Value 167.9

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL 0.315
 95% Jackknife UCL 0.317
 95% Standard Bootstrap UCL N/A
 95% Bootstrap-t UCL N/A
 95% Hall's Bootstrap UCL N/A
 95% Percentile Bootstrap UCL N/A
 95% BCA Bootstrap UCL N/A
 95% Chebyshev(Mean, Sd) UCL 0.372
 97.5% Chebyshev(Mean, Sd) UCL 0.412
 99% Chebyshev(Mean, Sd) UCL 0.49

Anderson-Darling Test Statistic 3.942
 Anderson-Darling 5% Critical Value 0.738
 Kolmogorov-Smirnov Test Statistic 0.479
 Kolmogorov-Smirnov 5% Critical Value 0.222
 Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 0.333
 95% Adjusted Gamma UCL 0.34

Potential UCL to Use

Use 95% Student's-t UCL 0.317
 or 95% Modified-t UCL 0.317

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	11
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Raw Statistics

Minimum	8.45	Log-transformed Statistics	
Maximum	114	Minimum of Log Data	2.134
Mean	26.7	Maximum of Log Data	4.736
Median	20	Mean of log Data	3
SD	27.3	SD of log Data	0.701
Coefficient of Variation	1.022		
Skewness	2.756		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.615	Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	39.12	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	39.56
95% Adjusted-CLT UCL (Chen-1995)	43.65	95% Chebyshev (MVUE) UCL	46.12
95% Modified-t UCL (Johnson-1978)	39.95	97.5% Chebyshev (MVUE) UCL	55.18
		99% Chebyshev (MVUE) UCL	72.97

Gamma Distribution Test

k star (bias corrected)	1.57	Data Distribution	
Theta Star	17.01	Data appear Lognormal at 5% Significance Level	
MLE of Mean	26.7		
MLE of Standard Deviation	21.31		
nu star	47.09	Nonparametric Statistics	
Approximate Chi Square Value (.05)	32.34	95% CLT UCL	38.29
Adjusted Level of Significance	0.0324	95% Jackknife UCL	39.12
Adjusted Chi Square Value	30.84	95% Standard Bootstrap UCL	37.89
Anderson-Darling Test Statistic	1.173	95% Bootstrap-t UCL	67.69
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	97.82
Kolmogorov-Smirnov Test Statistic	0.286	95% Percentile Bootstrap UCL	39.07
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	43.69
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	57.42
		97.5% Chebyshev(Mean, Sd) UCL	70.72
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	96.83
95% Approximate Gamma UCL	38.88		
95% Adjusted Gamma UCL	40.77		

Potential UCL to Use		Use 95% H-UCL	39.56
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ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	1.38	Log-transformed Statistics	
Maximum	2.06	Minimum of Log Data	0.322
Mean	1.72	Maximum of Log Data	0.723
Median	1.72	Mean of log Data	0.54
SD	0.129	SD of log Data	0.076
Coefficient of Variation	0.0747		
Skewness	5.9E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.53	Shapiro Wilk Test Statistic	0.526
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1.778	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	1.775	95% Chebyshev (MVUE) UCL	1.867
95% Modified-t UCL (Johnson-1978)	1.778	97.5% Chebyshev (MVUE) UCL	1.931
		99% Chebyshev (MVUE) UCL	2.056

Gamma Distribution Test

k star (bias corrected)	150.7	Data Distribution	
Theta Star	0.0114	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	1.72		
MLE of Standard Deviation	0.14		
nu star	4521		
Approximate Chi Square Value (.05)	4366	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	1.775
Adjusted Chi Square Value	4347	95% Jackknife UCL	1.778
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	3.81	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.443	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.865
		97.5% Chebyshev(Mean, Sd) UCL	1.927
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.05
95% Approximate Gamma UCL	1.781		
95% Adjusted Gamma UCL	1.789		

Potential UCL to Use		Use 95% Student's-t UCL	1.778
		or 95% Modified-t UCL	1.778

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-03.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
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Raw Statistics

Minimum	17.6
Maximum	85
Mean	74.24
Median	85
SD	22.72
Coefficient of Variation	0.306
Skewness	-1.845

Log-transformed Statistics

Minimum of Log Data	2.868
Maximum of Log Data	4.443
Mean of log Data	4.23
SD of log Data	0.471

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.534	Shapiro Wilk Test Statistic	0.529
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	84.58
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	80.91
95% Modified-t UCL (Johnson-1978)	84.11

Assuming Lognormal Distribution

95% H-UCL	99.24
95% Chebyshev (MVUE) UCL	117.6
97.5% Chebyshev (MVUE) UCL	135.6
99% Chebyshev (MVUE) UCL	170.8

Gamma Distribution Test

k star (bias corrected)	5.366
Theta Star	13.84
MLE of Mean	74.24
MLE of Standard Deviation	32.05
nu star	161
Approximate Chi Square Value (.05)	132.7
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	129.5

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	83.89
95% Jackknife UCL	84.58
95% Standard Bootstrap UCL	83.2
95% Bootstrap-t UCL	82.38
95% Hall's Bootstrap UCL	81.34
95% Percentile Bootstrap UCL	81.76
95% BCA Bootstrap UCL	80.51
95% Chebyshev(Mean, Sd) UCL	99.81
97.5% Chebyshev(Mean, Sd) UCL	110.9
99% Chebyshev(Mean, Sd) UCL	132.6

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	3.587
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.486
Kolmogorov-Smirnov 5% Critical Value	0.222

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	90.1
95% Adjusted Gamma UCL	92.31

Potential UCL to Use

Use 95% Student's-t UCL	84.58
or 95% Modified-t UCL	84.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	5
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Raw Statistics

Minimum	12.4	Log-transformed Statistics	
Maximum	239.6	Minimum of Log Data	2.518
Mean	53.4	Maximum of Log Data	5.479
Median	35	Mean of log Data	3.689
SD	58.33	SD of log Data	0.677
Coefficient of Variation	1.092		
Skewness	2.855		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.491	Shapiro Wilk Test Statistic	0.657
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	79.93	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	75.95
95% Adjusted-CLT UCL (Chen-1995)	90.04	95% Chebyshev (MVUE) UCL	88.99
95% Modified-t UCL (Johnson-1978)	81.78	97.5% Chebyshev (MVUE) UCL	106.1
		99% Chebyshev (MVUE) UCL	139.7

Gamma Distribution Test

k star (bias corrected)	1.55	Data Distribution	
Theta Star	34.44	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	53.4		
MLE of Standard Deviation	42.89		
nu star	46.51		
Approximate Chi Square Value (.05)	31.86	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	78.17
Adjusted Chi Square Value	30.38	95% Jackknife UCL	79.93
		95% Standard Bootstrap UCL	77.51
Anderson-Darling Test Statistic	3.182	95% Bootstrap-t UCL	251.5
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	391.2
Kolmogorov-Smirnov Test Statistic	0.48	95% Percentile Bootstrap UCL	80.56
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	87.93
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	119
		97.5% Chebyshev(Mean, Sd) UCL	147.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	203.3
95% Approximate Gamma UCL	77.95		
95% Adjusted Gamma UCL	81.77		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	119
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	9
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Raw Statistics

Minimum	23.1	Log-transformed Statistics	
Maximum	631	Minimum of Log Data	3.14
Mean	152.2	Maximum of Log Data	6.447
Median	65	Mean of log Data	4.659
SD	159	SD of log Data	0.843
Coefficient of Variation	1.044		
Skewness	2.272		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.697	Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	224.5	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	264.8
95% Adjusted-CLT UCL (Chen-1995)	245.4	95% Chebyshev (MVUE) UCL	294.8
95% Modified-t UCL (Johnson-1978)	228.5	97.5% Chebyshev (MVUE) UCL	359.2
		99% Chebyshev (MVUE) UCL	485.6

Gamma Distribution Test

k star (bias corrected)	1.254	Data Distribution	
Theta Star	121.4	Data appear Lognormal at 5% Significance Level	
MLE of Mean	152.2		
MLE of Standard Deviation	135.9		
nu star	37.61		
Approximate Chi Square Value (.05)	24.57	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	219.7
Adjusted Chi Square Value	23.28	95% Jackknife UCL	224.5
		95% Standard Bootstrap UCL	216.9
Anderson-Darling Test Statistic	1.068	95% Bootstrap-t UCL	286.1
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	425.3
Kolmogorov-Smirnov Test Statistic	0.268	95% Percentile Bootstrap UCL	222.7
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	244.1
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	331.1
		97.5% Chebyshev(Mean, Sd) UCL	408.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	560.6
95% Approximate Gamma UCL	233		
95% Adjusted Gamma UCL	245.9		

Potential UCL to Use		Use 95% H-UCL	264.8
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ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.063
Maximum	13.32
Mean	9.559
Median	10
SD	2.763
Coefficient of Variation	0.289
Skewness	-3.135

Log-transformed Statistics

Minimum of Log Data	-2.765
Maximum of Log Data	2.589
Mean of log Data	1.984
SD of log Data	1.316

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.436	Shapiro Wilk Test Statistic	0.314
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.82
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	10.12
95% Modified-t UCL (Johnson-1978)	10.72

Assuming Lognormal Distribution

95% H-UCL	54.71
95% Chebyshev (MVUE) UCL	41.97
97.5% Chebyshev (MVUE) UCL	53.32
99% Chebyshev (MVUE) UCL	75.63

Gamma Distribution Test

k star (bias corrected)	1.627
Theta Star	5.876
MLE of Mean	9.559
MLE of Standard Deviation	7.494
nu star	48.81
Approximate Chi Square Value (.05)	33.77
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	32.23

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	10.73
95% Jackknife UCL	10.82
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	12.67
97.5% Chebyshev(Mean, Sd) UCL	14.01
99% Chebyshev(Mean, Sd) UCL	16.66

Anderson-Darling Test Statistic	5.006
Anderson-Darling 5% Critical Value	0.747
Kolmogorov-Smirnov Test Statistic	0.552
Kolmogorov-Smirnov 5% Critical Value	0.224
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.82
95% Adjusted Gamma UCL	14.47

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 12.67

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	9
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Raw Statistics

Minimum	6.4	Log-transformed Statistics	
Maximum	28.18	Minimum of Log Data	1.856
Mean	16.51	Maximum of Log Data	3.339
Median	20	Mean of log Data	2.729
SD	5.986	SD of log Data	0.425
Coefficient of Variation	0.363		
Skewness	-0.176		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.894	Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	19.23	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	21.02
95% Adjusted-CLT UCL (Chen-1995)	18.97	95% Chebyshev (MVUE) UCL	24.8
95% Modified-t UCL (Johnson-1978)	19.22	97.5% Chebyshev (MVUE) UCL	28.32
		99% Chebyshev (MVUE) UCL	35.24

Gamma Distribution Test

k star (bias corrected)	5.502	Data Distribution	
Theta Star	3	Data appear Normal at 5% Significance Level	
MLE of Mean	16.51		
MLE of Standard Deviation	7.037		
nu star	165.1		
Approximate Chi Square Value (.05)	136.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	19.05
Adjusted Chi Square Value	133.1	95% Jackknife UCL	19.23
		95% Standard Bootstrap UCL	18.96
Anderson-Darling Test Statistic	0.998	95% Bootstrap-t UCL	19.05
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	19.07
Kolmogorov-Smirnov Test Statistic	0.274	95% Percentile Bootstrap UCL	18.9
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	18.74
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23.24
		97.5% Chebyshev(Mean, Sd) UCL	26.16
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	31.88
95% Approximate Gamma UCL	19.98		
95% Adjusted Gamma UCL	20.46		

Potential UCL to Use		Use 95% Student's-t UCL	19.23
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-04.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	5
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Raw Statistics

Minimum	13	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.565
Mean	71.9	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.18
SD	23.59	SD of log Data	0.538
Coefficient of Variation	0.328		
Skewness	-1.737		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.629	Shapiro Wilk Test Statistic	0.576
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	82.63	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	102.3
95% Adjusted-CLT UCL (Chen-1995)	79.01	95% Chebyshev (MVUE) UCL	121.5
95% Modified-t UCL (Johnson-1978)	82.18	97.5% Chebyshev (MVUE) UCL	141.7
		99% Chebyshev (MVUE) UCL	181.5

Gamma Distribution Test

k star (bias corrected)	4.364	Data Distribution	
Theta Star	16.48	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	71.9		
MLE of Standard Deviation	34.42	Nonparametric Statistics	
nu star	130.9	95% CLT UCL	81.92
Approximate Chi Square Value (.05)	105.5	95% Jackknife UCL	82.63
Adjusted Level of Significance	0.0324	95% Standard Bootstrap UCL	81.49
Adjusted Chi Square Value	102.7	95% Bootstrap-t UCL	80.05
Anderson-Darling Test Statistic	2.826	95% Hall's Bootstrap UCL	79.38
Anderson-Darling 5% Critical Value	0.738	95% Percentile Bootstrap UCL	80.7
Kolmogorov-Smirnov Test Statistic	0.373	95% BCA Bootstrap UCL	79.26
Kolmogorov-Smirnov 5% Critical Value	0.222	95% Chebyshev(Mean, Sd) UCL	98.45
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	109.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	132.5
95% Approximate Gamma UCL	89.24		
95% Adjusted Gamma UCL	91.68		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	98.45
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	6
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Raw Statistics

Minimum	9.6	Log-transformed Statistics	
Maximum	242.7	Minimum of Log Data	2.262
Mean	49.55	Maximum of Log Data	5.492
Median	35	Mean of log Data	3.653
SD	54.26	SD of log Data	0.635
Coefficient of Variation	1.095		
Skewness	3.666		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.427	Shapiro Wilk Test Statistic	0.695
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	74.23	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	68.87
95% Adjusted-CLT UCL (Chen-1995)	86.77	95% Chebyshev (MVUE) UCL	81.24
95% Modified-t UCL (Johnson-1978)	76.44	97.5% Chebyshev (MVUE) UCL	96.28
		99% Chebyshev (MVUE) UCL	125.8

Gamma Distribution Test

k star (bias corrected)	1.768	Data Distribution	
Theta Star	28.04	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	49.55		
MLE of Standard Deviation	37.27		
nu star	53.03		
Approximate Chi Square Value (.05)	37.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	72.6
Adjusted Chi Square Value	35.68	95% Jackknife UCL	74.23
		95% Standard Bootstrap UCL	72.41
Anderson-Darling Test Statistic	2.656	95% Bootstrap-t UCL	160.4
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	192.1
Kolmogorov-Smirnov Test Statistic	0.343	95% Percentile Bootstrap UCL	76.52
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	90.12
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	110.6
		97.5% Chebyshev(Mean, Sd) UCL	137
		99% Chebyshev(Mean, Sd) UCL	188.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	70.45
95% Adjusted Gamma UCL	73.65

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	110.6
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.0347	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.361
Mean	9.21	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.912
SD	2.553	SD of log Data	1.459
Coefficient of Variation	0.277		
Skewness	-3.796		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.35	Shapiro Wilk Test Statistic	0.296
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.37
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9.604
95% Modified-t UCL (Johnson-1978)	10.26

Assuming Lognormal Distribution

95% H-UCL	77.88
95% Chebyshev (MVUE) UCL	49.67
97.5% Chebyshev (MVUE) UCL	63.67
99% Chebyshev (MVUE) UCL	91.18

Gamma Distribution Test

k star (bias corrected)	1.461
Theta Star	6.306
MLE of Mean	9.21
MLE of Standard Deviation	7.62
nu star	43.82
Approximate Chi Square Value (.05)	29.64
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	28.2

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.75
Kolmogorov-Smirnov Test Statistic	0.533
Kolmogorov-Smirnov 5% Critical Value	0.225

Nonparametric Statistics

95% CLT UCL	10.29
95% Jackknife UCL	10.37
95% Standard Bootstrap UCL	10.26
95% Bootstrap-t UCL	10.02
95% Hall's Bootstrap UCL	9.859
95% Percentile Bootstrap UCL	9.927
95% BCA Bootstrap UCL	9.874
95% Chebyshev(Mean, Sd) UCL	12.08
97.5% Chebyshev(Mean, Sd) UCL	13.33
99% Chebyshev(Mean, Sd) UCL	15.77

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.62
95% Adjusted Gamma UCL	14.31

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	12.08
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations

15

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	10
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Raw Statistics

Minimum	65	Log-transformed Statistics	
Maximum	587.2	Minimum of Log Data	4.174
Mean	136	Maximum of Log Data	6.375
Median	112.2	Mean of log Data	4.701
SD	129.6	SD of log Data	0.583
Coefficient of Variation	0.953		
Skewness	3.395		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.518	Shapiro Wilk Test Statistic	0.784
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	195	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	182.7
95% Adjusted-CLT UCL (Chen-1995)	222.4	95% Chebyshev (MVUE) UCL	216.6
95% Modified-t UCL (Johnson-1978)	199.9	97.5% Chebyshev (MVUE) UCL	254.6
		99% Chebyshev (MVUE) UCL	329.2

Gamma Distribution Test

k star (bias corrected)	2.058	Data Distribution	
Theta Star	66.11	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	136		
MLE of Standard Deviation	94.83		
nu star	61.73		
Approximate Chi Square Value (.05)	44.66	Nonparametric Statistics	
Adjusted Level of Significance	0.0324	95% CLT UCL	191.1
Adjusted Chi Square Value	42.87	95% Jackknife UCL	195
		95% Standard Bootstrap UCL	189.9
Anderson-Darling Test Statistic	1.472	95% Bootstrap-t UCL	291.7
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	406.2
Kolmogorov-Smirnov Test Statistic	0.269	95% Percentile Bootstrap UCL	196.4
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	232.2
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	281.9
		97.5% Chebyshev(Mean, Sd) UCL	345.1
		99% Chebyshev(Mean, Sd) UCL	469.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	188
95% Adjusted Gamma UCL	195.9

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	281.9
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	3
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Raw Statistics

Minimum	10	Log-transformed Statistics	
Maximum	12.25	Minimum of Log Data	2.303
Mean	10.17	Maximum of Log Data	2.506
Median	10	Mean of log Data	2.318
SD	0.578	SD of log Data	0.0521
Coefficient of Variation	0.0568		
Skewness	3.802		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.339	Shapiro Wilk Test Statistic	0.345
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.44
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	10.57
95% Modified-t UCL (Johnson-1978)	10.46

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	10.77
97.5% Chebyshev (MVUE) UCL	11.03
99% Chebyshev (MVUE) UCL	11.53

Gamma Distribution Test

k star (bias corrected)	298.2
Theta Star	0.0341
MLE of Mean	10.17
MLE of Standard Deviation	0.589
nu star	8945
Approximate Chi Square Value (.05)	8726
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	8700

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	4.525
Anderson-Darling 5% Critical Value	0.734
Kolmogorov-Smirnov Test Statistic	0.426
Kolmogorov-Smirnov 5% Critical Value	0.221
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	10.42
95% Jackknife UCL	10.44
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	10.82
97.5% Chebyshev(Mean, Sd) UCL	11.1
99% Chebyshev(Mean, Sd) UCL	11.66

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.43
95% Adjusted Gamma UCL	10.46

Potential UCL to Use

Use 95% Student's-t UCL	10.44
or 95% Modified-t UCL	10.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations

15

Number of Distinct Observations

1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	7
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Raw Statistics

Minimum	8.74	Log-transformed Statistics	
Maximum	48.82	Minimum of Log Data	2.168
Mean	20.01	Maximum of Log Data	3.888
Median	20	Mean of log Data	2.926
SD	8.828	SD of log Data	0.374
Coefficient of Variation	0.441		
Skewness	2.565		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.736
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	24.02	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	24.3
95% Adjusted-CLT UCL (Chen-1995)	25.37	95% Chebyshev (MVUE) UCL	28.44
95% Modified-t UCL (Johnson-1978)	24.27	97.5% Chebyshev (MVUE) UCL	32.13
		99% Chebyshev (MVUE) UCL	39.38

Gamma Distribution Test

k star (bias corrected)	5.912	Data Distribution	
Theta Star	3.384	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	20.01		
MLE of Standard Deviation	8.229		
nu star	177.4	Nonparametric Statistics	
Approximate Chi Square Value (.05)	147.6	95% CLT UCL	23.76
Adjusted Level of Significance	0.0324	95% Jackknife UCL	24.02
Adjusted Chi Square Value	144.2	95% Standard Bootstrap UCL	23.57

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.213	95% Bootstrap-t UCL	26.05
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	41.53
Kolmogorov-Smirnov Test Statistic	0.384	95% Percentile Bootstrap UCL	23.84
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	25.14
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29.94

Assuming Gamma Distribution

95% Approximate Gamma UCL	24.05	97.5% Chebyshev(Mean, Sd) UCL	34.24
95% Adjusted Gamma UCL	24.61	99% Chebyshev(Mean, Sd) UCL	42.69

Potential UCL to Use

Use 95% Student's-t UCL	24.02
or 95% Modified-t UCL	24.27

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-235

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-235 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	520-05.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Antimony was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Chromium

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	4
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Raw Statistics

Minimum	21	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.045
Mean	72.54	Maximum of Log Data	4.443
Median	85	Mean of log Data	4.211
SD	22.4	SD of log Data	0.46
Coefficient of Variation	0.309		
Skewness	-1.836		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.634	Shapiro Wilk Test Statistic	0.593
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	84.78
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	79.65
95% Modified-t UCL (Johnson-1978)	84.16

Assuming Lognormal Distribution

95% H-UCL	102
95% Chebyshev (MVUE) UCL	119.7
97.5% Chebyshev (MVUE) UCL	139.5
99% Chebyshev (MVUE) UCL	178.2

Gamma Distribution Test

k star (bias corrected)	5.132
Theta Star	14.13
MLE of Mean	72.54
MLE of Standard Deviation	32.02
nu star	112.9
Approximate Chi Square Value (.05)	89.37
Adjusted Level of Significance	0.0278
Adjusted Chi Square Value	85.96

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Anderson-Darling Test Statistic	2.104
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.369
Kolmogorov-Smirnov 5% Critical Value	0.256
Data not Gamma Distributed at 5% Significance Level	

Nonparametric Statistics

95% CLT UCL	83.65
95% Jackknife UCL	84.78
95% Standard Bootstrap UCL	82.83
95% Bootstrap-t UCL	82.08
95% Hall's Bootstrap UCL	79.75
95% Percentile Bootstrap UCL	81.6
95% BCA Bootstrap UCL	80.47
95% Chebyshev(Mean, Sd) UCL	102
97.5% Chebyshev(Mean, Sd) UCL	114.7
99% Chebyshev(Mean, Sd) UCL	139.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	91.63
95% Adjusted Gamma UCL	95.26

Potential UCL to Use

Use 95% Student's-t UCL	84.78
or 95% Modified-t UCL	84.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Neptunium-237

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Neptunium-237 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Nickel

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	5
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Raw Statistics

Minimum	16.1	Log-transformed Statistics	
Maximum	220.4	Minimum of Log Data	2.779
Mean	80.52	Maximum of Log Data	5.396
Median	65	Mean of log Data	4.235
SD	50.48	SD of log Data	0.605
Coefficient of Variation	0.627		
Skewness	2.332		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.675	Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	108.1	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	129.3
95% Adjusted-CLT UCL (Chen-1995)	117	95% Chebyshev (MVUE) UCL	148
95% Modified-t UCL (Johnson-1978)	109.9	97.5% Chebyshev (MVUE) UCL	176.8
		99% Chebyshev (MVUE) UCL	233.4

Gamma Distribution Test

k star (bias corrected)	2.543	Data Distribution	
Theta Star	31.66	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	80.52		
MLE of Standard Deviation	50.5		
nu star	55.95		
Approximate Chi Square Value (.05)	39.76	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	105.6
Adjusted Chi Square Value	37.54	95% Jackknife UCL	108.1
		95% Standard Bootstrap UCL	104.6

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	1.288	95% Bootstrap-t UCL	133.3
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	239.1
Kolmogorov-Smirnov Test Statistic	0.331	95% Percentile Bootstrap UCL	108.8
Kolmogorov-Smirnov 5% Critical Value	0.257	95% BCA Bootstrap UCL	111.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	146.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	113.3	97.5% Chebyshev(Mean, Sd) UCL	175.6
95% Adjusted Gamma UCL	120	99% Chebyshev(Mean, Sd) UCL	232

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	146.9
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Uranium-238

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	1
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Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium-238 was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	081-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	8
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Raw Statistics

Minimum	5470	Log-transformed Statistics	
Maximum	13000	Minimum of Log Data	8.607
Mean	9120	Maximum of Log Data	9.473
Median	9120	Mean of log Data	9.108
SD	1274	SD of log Data	0.151
Coefficient of Variation	0.14		
Skewness	-0.164		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.605	Shapiro Wilk Test Statistic	0.581
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9547	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9621
95% Adjusted-CLT UCL (Chen-1995)	9523	95% Chebyshev (MVUE) UCL	10308
95% Modified-t UCL (Johnson-1978)	9546	97.5% Chebyshev (MVUE) UCL	10819
		99% Chebyshev (MVUE) UCL	11824

Gamma Distribution Test

k star (bias corrected)	43.24	Data Distribution	
Theta Star	210.9	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9120		
MLE of Standard Deviation	1387		
nu star	2248		
Approximate Chi Square Value (.05)	2139	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9531
Adjusted Chi Square Value	2132	95% Jackknife UCL	9547
		95% Standard Bootstrap UCL	9525
Anderson-Darling Test Statistic	5.483	95% Bootstrap-t UCL	9527
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	9620
Kolmogorov-Smirnov Test Statistic	0.442	95% Percentile Bootstrap UCL	9517
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	9493
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10209
		97.5% Chebyshev(Mean, Sd) UCL	10681
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11607
95% Approximate Gamma UCL	9585		
95% Adjusted Gamma UCL	9617		

Potential UCL to Use

		Use 95% Student's-t UCL	9547
		or 95% Modified-t UCL	9546

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	21
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Raw Statistics

Minimum	6.32	Log-transformed Statistics	
Maximum	13.71	Minimum of Log Data	1.844
Mean	10.4	Maximum of Log Data	2.618
Median	10.4	Mean of log Data	2.32
SD	2.108	SD of log Data	0.218
Coefficient of Variation	0.203		
Skewness	-0.316		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.947	Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.11	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	11.26
95% Adjusted-CLT UCL (Chen-1995)	11.05	95% Chebyshev (MVUE) UCL	12.37
95% Modified-t UCL (Johnson-1978)	11.1	97.5% Chebyshev (MVUE) UCL	13.22
		99% Chebyshev (MVUE) UCL	14.88

Gamma Distribution Test

k star (bias corrected)	20.57	Data Distribution	
Theta Star	0.506	Data appear Normal at 5% Significance Level	
MLE of Mean	10.4		
MLE of Standard Deviation	2.293		
nu star	1070		

Approximate Chi Square Value (.05)

Adjusted Level of Significance	0.0398	Nonparametric Statistics	
Adjusted Chi Square Value	989.9	95% CLT UCL	11.08

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.744	95% Jackknife UCL	11.11
Kolmogorov-Smirnov Test Statistic	0.159	95% Standard Bootstrap UCL	11.06
Kolmogorov-Smirnov 5% Critical Value	0.171	95% Bootstrap-t UCL	11.11
Data appear Gamma Distributed at 5% Significance Level		95% Hall's Bootstrap UCL	11.05
		95% Percentile Bootstrap UCL	11.06
		95% BCA Bootstrap UCL	11.01
		95% Chebyshev(Mean, Sd) UCL	12.2
		97.5% Chebyshev(Mean, Sd) UCL	12.98
		99% Chebyshev(Mean, Sd) UCL	14.51

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.18
95% Adjusted Gamma UCL	11.24

Potential UCL to Use

Use 95% Student's-t UCL	11.11
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	7
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Raw Statistics

Minimum	0.5	Log-transformed Statistics	
Maximum	1	Minimum of Log Data	-0.693
Mean	0.669	Maximum of Log Data	0
Median	0.669	Mean of log Data	-0.41
SD	0.0882	SD of log Data	0.126
Coefficient of Variation	0.132		
Skewness	1.628		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.606	Shapiro Wilk Test Statistic	0.637
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.698	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.698
95% Adjusted-CLT UCL (Chen-1995)	0.703	95% Chebyshev (MVUE) UCL	0.741
95% Modified-t UCL (Johnson-1978)	0.699	97.5% Chebyshev (MVUE) UCL	0.772
		99% Chebyshev (MVUE) UCL	0.833

Gamma Distribution Test

k star (bias corrected)	56.9	Data Distribution	
Theta Star	0.0117	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.669		
MLE of Standard Deviation	0.0886		
nu star	2959		
Approximate Chi Square Value (.05)	2834	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	0.697
Adjusted Chi Square Value	2825	95% Jackknife UCL	0.698
		95% Standard Bootstrap UCL	0.697
Anderson-Darling Test Statistic	4.858	95% Bootstrap-t UCL	0.703
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	0.746
Kolmogorov-Smirnov Test Statistic	0.401	95% Percentile Bootstrap UCL	0.697
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	0.703
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.744
		97.5% Chebyshev(Mean, Sd) UCL	0.777
		99% Chebyshev(Mean, Sd) UCL	0.841

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.698
95% Adjusted Gamma UCL	0.7

Potential UCL to Use

Use 95% Student's-t UCL	0.698
or 95% Modified-t UCL	0.699

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	18
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Raw Statistics

Minimum	14	Log-transformed Statistics	
Maximum	108.1	Minimum of Log Data	2.639
Mean	55.83	Maximum of Log Data	4.683
Median	51.17	Mean of log Data	3.923
SD	23.79	SD of log Data	0.482
Coefficient of Variation	0.426		
Skewness	0.402		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.922	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	68.52
95% Adjusted-CLT UCL (Chen-1995)	63.9	95% Chebyshev (MVUE) UCL	80.69
95% Modified-t UCL (Johnson-1978)	63.86	97.5% Chebyshev (MVUE) UCL	91.17
		99% Chebyshev (MVUE) UCL	111.7

Gamma Distribution Test

k star (bias corrected)	4.602	Data Distribution	
Theta Star	12.13	Data appear Normal at 5% Significance Level	
MLE of Mean	55.83		
MLE of Standard Deviation	26.02		
nu star	239.3		
Approximate Chi Square Value (.05)	204.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	63.5
Adjusted Chi Square Value	202.4	95% Jackknife UCL	63.8
		95% Standard Bootstrap UCL	63.07
Anderson-Darling Test Statistic	0.742	95% Bootstrap-t UCL	64.49
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	64.01
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	63.3
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	63.89
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	76.16
		97.5% Chebyshev(Mean, Sd) UCL	84.96
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	102.2
95% Approximate Gamma UCL	65.33		
95% Adjusted Gamma UCL	66.02		

Potential UCL to Use

Use 95% Student's-t UCL	63.8
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	8
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Raw Statistics

Minimum	6.3	Log-transformed Statistics	
Maximum	48.3	Minimum of Log Data	1.841
Mean	13.26	Maximum of Log Data	3.877
Median	13.26	Mean of log Data	2.498
SD	7.585	SD of log Data	0.383
Coefficient of Variation	0.572		
Skewness	4.144		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.434	Shapiro Wilk Test Statistic	0.655
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	15.8	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	15.11
95% Adjusted-CLT UCL (Chen-1995)	17	95% Chebyshev (MVUE) UCL	17.43
95% Modified-t UCL (Johnson-1978)	16	97.5% Chebyshev (MVUE) UCL	19.32
		99% Chebyshev (MVUE) UCL	23.05

Gamma Distribution Test

k star (bias corrected)	5.292	Data Distribution	
Theta Star	2.505	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	13.26		
MLE of Standard Deviation	5.763		
nu star	275.2		
Approximate Chi Square Value (.05)	237.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	15.7
Adjusted Chi Square Value	235.5	95% Jackknife UCL	15.8
		95% Standard Bootstrap UCL	15.71
Anderson-Darling Test Statistic	4.264	95% Bootstrap-t UCL	18.56
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	26.3
Kolmogorov-Smirnov Test Statistic	0.407	95% Percentile Bootstrap UCL	15.91
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	17.95
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	19.74
		97.5% Chebyshev(Mean, Sd) UCL	22.55
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	28.06
95% Approximate Gamma UCL	15.34		
95% Adjusted Gamma UCL	15.49		

Potential UCL to Use

Use 95% Student's-t UCL	15.8
or 95% Modified-t UCL	16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	23
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Raw Statistics

Minimum	122	Log-transformed Statistics	
Maximum	3650	Minimum of Log Data	4.804
Mean	907.4	Maximum of Log Data	8.202
Median	740.4	Mean of log Data	6.63
SD	662.2	SD of log Data	0.613
Coefficient of Variation	0.73		
Skewness	3.033		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.7	Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	1129	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1177
95% Adjusted-CLT UCL (Chen-1995)	1204	95% Chebyshev (MVUE) UCL	1410
95% Modified-t UCL (Johnson-1978)	1142	97.5% Chebyshev (MVUE) UCL	1628
		99% Chebyshev (MVUE) UCL	2055

Gamma Distribution Test

k star (bias corrected)	2.615	Data Distribution	
Theta Star	347	Data Follow Appr. Gamma Distribution at 5% Significance Level	
MLE of Mean	907.4		
MLE of Standard Deviation	561.2		
nu star	136		
Approximate Chi Square Value (.05)	110	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	1121
Adjusted Chi Square Value	108.5	95% Jackknife UCL	1129
		95% Standard Bootstrap UCL	1120
Anderson-Darling Test Statistic	0.792	95% Bootstrap-t UCL	1277
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	2075
Kolmogorov-Smirnov Test Statistic	0.153	95% Percentile Bootstrap UCL	1133
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	1228
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1474
		97.5% Chebyshev(Mean, Sd) UCL	1718
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2200
95% Approximate Gamma UCL	1121		
95% Adjusted Gamma UCL	1137		

Potential UCL to Use		Use 95% Approximate Gamma UCL	1121
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	11
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Raw Statistics

Minimum	0.0081	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.816
Mean	6.635	Maximum of Log Data	2.303
Median	9.165	Mean of log Data	0.617
SD	4.269	SD of log Data	2.683
Coefficient of Variation	0.643		
Skewness	-0.842		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.707	Shapiro Wilk Test Statistic	0.635
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.065	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1077
95% Adjusted-CLT UCL (Chen-1995)	7.865	95% Chebyshev (MVUE) UCL	168.6
95% Modified-t UCL (Johnson-1978)	8.042	97.5% Chebyshev (MVUE) UCL	223.5
		99% Chebyshev (MVUE) UCL	331.2

Gamma Distribution Test

k star (bias corrected)	0.467	Data Distribution	
Theta Star	14.22	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	6.635		
MLE of Standard Deviation	9.715		
nu star	24.26		
Approximate Chi Square Value (.05)	14.05	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	8.012
Adjusted Chi Square Value	13.53	95% Jackknife UCL	8.065
		95% Standard Bootstrap UCL	7.972
Anderson-Darling Test Statistic	4.984	95% Bootstrap-t UCL	7.933
Anderson-Darling 5% Critical Value	0.809	95% Hall's Bootstrap UCL	7.835
Kolmogorov-Smirnov Test Statistic	0.414	95% Percentile Bootstrap UCL	7.97
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	7.882
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.28
		97.5% Chebyshev(Mean, Sd) UCL	11.86
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.96
95% Approximate Gamma UCL	11.46		
95% Adjusted Gamma UCL	11.89		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	14.96
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	12
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Raw Statistics

Minimum	9.5	Log-transformed Statistics	
Maximum	114.2	Minimum of Log Data	2.251
Mean	51.84	Maximum of Log Data	4.738
Median	65	Mean of log Data	3.727
SD	27.06	SD of log Data	0.782
Coefficient of Variation	0.522		
Skewness	-0.261		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.837	Shapiro Wilk Test Statistic	0.746
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	60.9	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	80.15
95% Adjusted-CLT UCL (Chen-1995)	60.28	95% Chebyshev (MVUE) UCL	96.23
95% Modified-t UCL (Johnson-1978)	60.86	97.5% Chebyshev (MVUE) UCL	113.8
		99% Chebyshev (MVUE) UCL	148.4

Gamma Distribution Test

k star (bias corrected)	2.158	Data Distribution	
Theta Star	24.02	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	51.84		
MLE of Standard Deviation	35.29		
nu star	112.2		
Approximate Chi Square Value (.05)	88.76	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	60.57
Adjusted Chi Square Value	87.38	95% Jackknife UCL	60.9
		95% Standard Bootstrap UCL	60.34
Anderson-Darling Test Statistic	2.972	95% Bootstrap-t UCL	60.57
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	60.56
Kolmogorov-Smirnov Test Statistic	0.316	95% Percentile Bootstrap UCL	60.42
Kolmogorov-Smirnov 5% Critical Value	0.173	95% BCA Bootstrap UCL	60.23
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.97
		97.5% Chebyshev(Mean, Sd) UCL	84.98
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	104.6
95% Approximate Gamma UCL	65.53		
95% Adjusted Gamma UCL	66.57		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	74.97
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	20
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Raw Statistics

Minimum	0.015	Log-transformed Statistics	
Maximum	370	Minimum of Log Data	-4.2
Mean	19.22	Maximum of Log Data	5.914
Median	0.425	Mean of log Data	-0.0139
SD	71.97	SD of log Data	2.535
Coefficient of Variation	3.745		
Skewness	5.003		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.272	Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	43.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	293.9
95% Adjusted-CLT UCL (Chen-1995)	57.23	95% Chebyshev (MVUE) UCL	63.32
95% Modified-t UCL (Johnson-1978)	45.64	97.5% Chebyshev (MVUE) UCL	83.63
		99% Chebyshev (MVUE) UCL	123.5

Gamma Distribution Test

k star (bias corrected)	0.239	Data Distribution	
Theta Star	80.57	Data appear Lognormal at 5% Significance Level	
MLE of Mean	19.22		
MLE of Standard Deviation	39.35		
nu star	12.4		
Approximate Chi Square Value (.05)	5.494	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	42.44
Adjusted Chi Square Value	5.192	95% Jackknife UCL	43.33
		95% Standard Bootstrap UCL	42.37
Anderson-Darling Test Statistic	2.247	95% Bootstrap-t UCL	186.2
Anderson-Darling 5% Critical Value	0.877	95% Hall's Bootstrap UCL	132.5
Kolmogorov-Smirnov Test Statistic	0.226	95% Percentile Bootstrap UCL	46.86
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	63.85
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.74
		97.5% Chebyshev(Mean, Sd) UCL	107.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	159.7
95% Approximate Gamma UCL	43.39		
95% Adjusted Gamma UCL	45.91		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL	159.7
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	8
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Raw Statistics

Minimum	0.032	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.442
Mean	7.053	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.05
SD	4.09	SD of log Data	2.235
Coefficient of Variation	0.58		
Skewness	-0.973		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.692	Shapiro Wilk Test Statistic	0.574
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	8.423	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	247.6
95% Adjusted-CLT UCL (Chen-1995)	8.209	95% Chebyshev (MVUE) UCL	93.12
95% Modified-t UCL (Johnson-1978)	8.398	97.5% Chebyshev (MVUE) UCL	122
		99% Chebyshev (MVUE) UCL	178.7

Gamma Distribution Test

k star (bias corrected)	0.62	Data Distribution	
Theta Star	11.37	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	7.053		
MLE of Standard Deviation	8.954		
nu star	32.27		
Approximate Chi Square Value (.05)	20.28	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	8.372
Adjusted Chi Square Value	19.65	95% Jackknife UCL	8.423
		95% Standard Bootstrap UCL	8.319
Anderson-Darling Test Statistic	5.164	95% Bootstrap-t UCL	8.306
Anderson-Darling 5% Critical Value	0.792	95% Hall's Bootstrap UCL	8.211
Kolmogorov-Smirnov Test Statistic	0.39	95% Percentile Bootstrap UCL	8.332
Kolmogorov-Smirnov 5% Critical Value	0.179	95% BCA Bootstrap UCL	8.214
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.55
		97.5% Chebyshev(Mean, Sd) UCL	12.06
		99% Chebyshev(Mean, Sd) UCL	15.03

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.22
95% Adjusted Gamma UCL	11.58

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 97.5% Chebyshev (Mean, Sd) UCL	12.06
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	8
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Raw Statistics

Minimum	0.11	Log-transformed Statistics	
Maximum	0.8	Minimum of Log Data	-2.207
Mean	0.31	Maximum of Log Data	-0.223
Median	0.31	Mean of log Data	-1.224
SD	0.116	SD of log Data	0.328
Coefficient of Variation	0.373		
Skewness	2.968		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.572	Shapiro Wilk Test Statistic	0.697
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.349	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.35
95% Adjusted-CLT UCL (Chen-1995)	0.361	95% Chebyshev (MVUE) UCL	0.398
95% Modified-t UCL (Johnson-1978)	0.351	97.5% Chebyshev (MVUE) UCL	0.436
		99% Chebyshev (MVUE) UCL	0.511

Gamma Distribution Test

k star (bias corrected)	8.543	Data Distribution	
Theta Star	0.0363	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.31		
MLE of Standard Deviation	0.106		
nu star	444.2		
Approximate Chi Square Value (.05)	396.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	0.347
Adjusted Chi Square Value	393.4	95% Jackknife UCL	0.349
		95% Standard Bootstrap UCL	0.347
Anderson-Darling Test Statistic	4.035	95% Bootstrap-t UCL	0.369
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	0.547
Kolmogorov-Smirnov Test Statistic	0.38	95% Percentile Bootstrap UCL	0.35
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	0.363
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.409
		97.5% Chebyshev(Mean, Sd) UCL	0.452
		99% Chebyshev(Mean, Sd) UCL	0.536

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.347
95% Adjusted Gamma UCL	0.35

Potential UCL to Use

Use 95% Student's-t UCL	0.349
or 95% Modified-t UCL	0.351

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.0073	Minimum of Log Data	-4.92
Maximum	0.779	Maximum of Log Data	-0.25
Mean	0.401	Mean of log Data	-1.04
Median	0.401	SD of log Data	0.802
SD	0.109		
Coefficient of Variation	0.272		
Skewness	-0.244		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.4	Shapiro Wilk Test Statistic	0.267
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.438	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.701
95% Adjusted-CLT UCL (Chen-1995)	0.435	95% Chebyshev (MVUE) UCL	0.84
95% Modified-t UCL (Johnson-1978)	0.438	97.5% Chebyshev (MVUE) UCL	0.997
		99% Chebyshev (MVUE) UCL	1.303

Gamma Distribution Test

k star (bias corrected)	3.648	Data Distribution	
Theta Star	0.11	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.401		
MLE of Standard Deviation	0.21		
nu star	189.7		
Approximate Chi Square Value (.05)	158.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	0.436
Adjusted Chi Square Value	157	95% Jackknife UCL	0.438
		95% Standard Bootstrap UCL	0.436
Anderson-Darling Test Statistic	8.335	95% Bootstrap-t UCL	0.432
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	0.443
Kolmogorov-Smirnov Test Statistic	0.525	95% Percentile Bootstrap UCL	0.431
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	0.431
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.495
		97.5% Chebyshev(Mean, Sd) UCL	0.535
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.614
95% Approximate Gamma UCL	0.479		
95% Adjusted Gamma UCL	0.485		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.495
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	21
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Raw Statistics

Minimum	1.5	Log-transformed Statistics	
Maximum	6500	Minimum of Log Data	0.405
Mean	2646	Maximum of Log Data	8.78
Median	3050	Mean of log Data	6.11
SD	2143	SD of log Data	3.086
Coefficient of Variation	0.81		
Skewness	-0.111		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.859	Shapiro Wilk Test Statistic	0.723
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3363	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	1939952
95% Adjusted-CLT UCL (Chen-1995)	3327	95% Chebyshev (MVUE) UCL	109838
95% Modified-t UCL (Johnson-1978)	3362	97.5% Chebyshev (MVUE) UCL	146564
		99% Chebyshev (MVUE) UCL	218704

Gamma Distribution Test

k star (bias corrected)	0.358	Data Distribution	
Theta Star	7394	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2646		
MLE of Standard Deviation	4423		
nu star	18.61		
Approximate Chi Square Value (.05)	9.83	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	3337
Adjusted Chi Square Value	9.409	95% Jackknife UCL	3363
		95% Standard Bootstrap UCL	3325
Anderson-Darling Test Statistic	3.512	95% Bootstrap-t UCL	3321
Anderson-Darling 5% Critical Value	0.835	95% Hall's Bootstrap UCL	3316
Kolmogorov-Smirnov Test Statistic	0.357	95% Percentile Bootstrap UCL	3319
Kolmogorov-Smirnov 5% Critical Value	0.184	95% BCA Bootstrap UCL	3327
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4477
		97.5% Chebyshev(Mean, Sd) UCL	5270
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6827
95% Approximate Gamma UCL	5008		
95% Adjusted Gamma UCL	5232		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	6827
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	3
Raw Statistics		Log-transformed Statistics	
Minimum	1.82	Minimum of Log Data	0.599
Maximum	2.67	Maximum of Log Data	0.982
Mean	2.245	Mean of log Data	0.807
Median	2.245	SD of log Data	0.0544
SD	0.12		
Coefficient of Variation	0.0535		
Skewness	2.1E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.388	Shapiro Wilk Test Statistic	0.385
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.285	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	N/A
95% Adjusted-CLT UCL (Chen-1995)	2.284	95% Chebyshev (MVUE) UCL	2.35
95% Modified-t UCL (Johnson-1978)	2.285	97.5% Chebyshev (MVUE) UCL	2.395
		99% Chebyshev (MVUE) UCL	2.484

Gamma Distribution Test

k star (bias corrected)	315.3	Data Distribution	
Theta Star	0.00712	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2.245		
MLE of Standard Deviation	0.126		
nu star	16394		
Approximate Chi Square Value (.05)	16098	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	2.284
Adjusted Chi Square Value	16078	95% Jackknife UCL	2.285

Anderson-Darling Test Statistic	7.951	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.742	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.469	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.171	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	2.348
		97.5% Chebyshev(Mean, Sd) UCL	2.392
		99% Chebyshev(Mean, Sd) UCL	2.48

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.286		
95% Adjusted Gamma UCL	2.289		

Potential UCL to Use		Use 95% Student's-t UCL	2.285
		or 95% Modified-t UCL	2.285

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 081-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Aluminum

General Statistics

Number of Valid Observations 26 Number of Distinct Observations 4

Raw Statistics

Minimum	5470	Log-transformed Statistics	
Maximum	13000	Minimum of Log Data	8.607
Mean	9217	Maximum of Log Data	9.473
Median	9217	Mean of log Data	9.122
SD	1065	SD of log Data	0.125
Coefficient of Variation	0.116		
Skewness	0.0559		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.391	Shapiro Wilk Test Statistic	0.376
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9573	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	9629
95% Adjusted-CLT UCL (Chen-1995)	9563	95% Chebyshev (MVUE) UCL	10208
95% Modified-t UCL (Johnson-1978)	9574	97.5% Chebyshev (MVUE) UCL	10634
		99% Chebyshev (MVUE) UCL	11473

Gamma Distribution Test

k star (bias corrected)	63.43	Data Distribution	
Theta Star	145.3	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9217		
MLE of Standard Deviation	1157		
nu star	3299		
Approximate Chi Square Value (.05)	3166	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9560
Adjusted Chi Square Value	3158	95% Jackknife UCL	9573

Anderson-Darling Test Statistic	7.921	95% Standard Bootstrap UCL	9559
Anderson-Darling 5% Critical Value	0.743	95% Bootstrap-t UCL	9521
Kolmogorov-Smimov Test Statistic	0.464	95% Hall's Bootstrap UCL	9657
Kolmogorov-Smimov 5% Critical Value	0.171	95% Percentile Bootstrap UCL	9508
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9508
		95% Chebyshev(Mean, Sd) UCL	10127
		97.5% Chebyshev(Mean, Sd) UCL	10521
		99% Chebyshev(Mean, Sd) UCL	11295

Assuming Gamma Distribution

95% Approximate Gamma UCL	9602
95% Adjusted Gamma UCL	9628

Potential UCL to Use

Use 95% Student's-t UCL	9573
or 95% Modified-t UCL	9574

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	17
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Raw Statistics

Minimum	5.81	Log-transformed Statistics	
Maximum	13.71	Minimum of Log Data	1.76
Mean	9.601	Maximum of Log Data	2.618
Median	9.601	Mean of log Data	2.241
SD	1.932	SD of log Data	0.212
Coefficient of Variation	0.201		
Skewness	-0.0284		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.951	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	10.25	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.36
95% Adjusted-CLT UCL (Chen-1995)	10.22	95% Chebyshev (MVUE) UCL	11.36
95% Modified-t UCL (Johnson-1978)	10.25	97.5% Chebyshev (MVUE) UCL	12.12
		99% Chebyshev (MVUE) UCL	13.61

Gamma Distribution Test

k star (bias corrected)	21.52	Data Distribution	
Theta Star	0.446	Data appear Normal at 5% Significance Level	
MLE of Mean	9.601		
MLE of Standard Deviation	2.07		
nu star	1119		
Approximate Chi Square Value (.05)	1042	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	10.22
Adjusted Chi Square Value	1038	95% Jackknife UCL	10.25
		95% Standard Bootstrap UCL	10.21
Anderson-Darling Test Statistic	0.672	95% Bootstrap-t UCL	10.24
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	10.23
Kolmogorov-Smirnov Test Statistic	0.181	95% Percentile Bootstrap UCL	10.21
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	10.19
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.25
		97.5% Chebyshev(Mean, Sd) UCL	11.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.37
95% Approximate Gamma UCL	10.31		
95% Adjusted Gamma UCL	10.36		

Potential UCL to Use

Use 95% Student's-t UCL	10.25
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.5	Log-transformed Statistics	
Maximum	1	Minimum of Log Data	-0.693
Mean	0.733	Maximum of Log Data	0
Median	0.733	Mean of log Data	-0.315
SD	0.0712	SD of log Data	0.0989
Coefficient of Variation	0.0971		
Skewness	0.748		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.419	Shapiro Wilk Test Statistic	0.418
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.757	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL N/A	
95% Adjusted-CLT UCL (Chen-1995)	0.758	95% Chebyshev (MVUE) UCL	0.796
95% Modified-t UCL (Johnson-1978)	0.758	97.5% Chebyshev (MVUE) UCL	0.822
		99% Chebyshev (MVUE) UCL	0.875

Gamma Distribution Test

k star (bias corrected)	96.52	Data Distribution	
Theta Star	0.0076	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.733		
MLE of Standard Deviation	0.0746		
nu star	5019		
Approximate Chi Square Value (.05)	4855	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	0.756
Adjusted Chi Square Value	4845	95% Jackknife UCL	0.757
		95% Standard Bootstrap UCL	0.756
Anderson-Darling Test Statistic	7.399	95% Bootstrap-t UCL	0.756
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.772
Kolmogorov-Smirnov Test Statistic	0.449	95% Percentile Bootstrap UCL	0.754
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	0.755
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.794
		97.5% Chebyshev(Mean, Sd) UCL	0.821
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.872
95% Approximate Gamma UCL	0.758		
95% Adjusted Gamma UCL	0.76		

Potential UCL to Use		Use 95% Student's-t UCL	0.757
		or 95% Modified-t UCL	0.758

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	12
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Raw Statistics

Minimum	12.2	Log-transformed Statistics	
Maximum	108.1	Minimum of Log Data	2.501
Mean	64.42	Maximum of Log Data	4.683
Median	64.42	Mean of log Data	4.05
SD	25.48	SD of log Data	0.559
Coefficient of Variation	0.395		
Skewness	-0.561		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Test Statistic	0.785
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	72.95	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	84.03
95% Adjusted-CLT UCL (Chen-1995)	72.05	95% Chebyshev (MVUE) UCL	100.1
95% Modified-t UCL (Johnson-1978)	72.86	97.5% Chebyshev (MVUE) UCL	114.5
		99% Chebyshev (MVUE) UCL	143

Gamma Distribution Test

k star (bias corrected)	3.995	Data Distribution	
Theta Star	16.13	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	64.42		
MLE of Standard Deviation	32.23		
nu star	207.7	Nonparametric Statistics	
Approximate Chi Square Value (.05)	175.4	95% CLT UCL	72.64
Adjusted Level of Significance	0.0398	95% Jackknife UCL	72.95
Adjusted Chi Square Value	173.4	95% Standard Bootstrap UCL	72.75
		95% Bootstrap-t UCL	72.84
Anderson-Darling Test Statistic	1.732	95% Hall's Bootstrap UCL	71.91
Anderson-Darling 5% Critical Value	0.747	95% Percentile Bootstrap UCL	72.26
Kolmogorov-Smirnov Test Statistic	0.241	95% BCA Bootstrap UCL	72.04
Kolmogorov-Smirnov 5% Critical Value	0.172	95% Chebyshev(Mean, Sd) UCL	86.2
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	95.62
		99% Chebyshev(Mean, Sd) UCL	114.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	76.3		
95% Adjusted Gamma UCL	77.16		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	86.2
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.0375	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.283
Mean	8.503	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.695
SD	3.169	SD of log Data	1.602
Coefficient of Variation	0.373		
Skewness	-2.365		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.506	Shapiro Wilk Test Statistic	0.418
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.565	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	57.99
95% Adjusted-CLT UCL (Chen-1995)	9.217	95% Chebyshev (MVUE) UCL	48.44
95% Modified-t UCL (Johnson-1978)	9.517	97.5% Chebyshev (MVUE) UCL	61.7
		99% Chebyshev (MVUE) UCL	87.75

Gamma Distribution Test

k star (bias corrected)	1.144	Data Distribution	
Theta Star	7.435	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.503		
MLE of Standard Deviation	7.951		
nu star	59.47		
Approximate Chi Square Value (.05)	42.74	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9.525
Adjusted Chi Square Value	41.8	95% Jackknife UCL	9.565
		95% Standard Bootstrap UCL	9.498
Anderson-Darling Test Statistic	7.634	95% Bootstrap-t UCL	9.379
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	9.29
Kolmogorov-Smirnov Test Statistic	0.494	95% Percentile Bootstrap UCL	9.389
Kolmogorov-Smirnov 5% Critical Value	0.175	95% BCA Bootstrap UCL	9.265
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.21
		97.5% Chebyshev(Mean, Sd) UCL	12.38
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.69
95% Approximate Gamma UCL	11.83		
95% Adjusted Gamma UCL	12.1		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	11.21
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	8
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Raw Statistics

Minimum	9.5	Log-transformed Statistics	
Maximum	81.89	Minimum of Log Data	2.251
Mean	58.15	Maximum of Log Data	4.405
Median	65	Mean of log Data	3.972
SD	17.22	SD of log Data	0.532
Coefficient of Variation	0.296		
Skewness	-2.194		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.582	Shapiro Wilk Test Statistic	0.492
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	63.92	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	75.61
95% Adjusted-CLT UCL (Chen-1995)	62.15	95% Chebyshev (MVUE) UCL	89.74
95% Modified-t UCL (Johnson-1978)	63.68	97.5% Chebyshev (MVUE) UCL	102.3
		99% Chebyshev (MVUE) UCL	126.9

Gamma Distribution Test

k star (bias corrected)	5.002	Data Distribution	
Theta Star	11.63	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.15		
MLE of Standard Deviation	26		
nu star	260.1		
Approximate Chi Square Value (.05)	223.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	63.71
Adjusted Chi Square Value	221.5	95% Jackknife UCL	63.92
		95% Standard Bootstrap UCL	63.54
Anderson-Darling Test Statistic	6.076	95% Bootstrap-t UCL	63.03
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	62.41
Kolmogorov-Smirnov Test Statistic	0.441	95% Percentile Bootstrap UCL	63.35
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	62.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	72.87
		97.5% Chebyshev(Mean, Sd) UCL	79.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	91.75
95% Approximate Gamma UCL	67.6		
95% Adjusted Gamma UCL	68.27		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	72.87
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	20
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Raw Statistics

Minimum	0.015	Log-transformed Statistics	
Maximum	370	Minimum of Log Data	-4.2
Mean	19.39	Maximum of Log Data	5.914
Median	0.425	Mean of log Data	-0.0385
SD	71.94	SD of log Data	2.627
Coefficient of Variation	3.711		
Skewness	5.002		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.274	Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	43.49	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	432.5
95% Adjusted-CLT UCL (Chen-1995)	57.38	95% Chebyshev (MVUE) UCL	76.66
95% Modified-t UCL (Johnson-1978)	45.79	97.5% Chebyshev (MVUE) UCL	101.5
		99% Chebyshev (MVUE) UCL	150.2

Gamma Distribution Test

k star (bias corrected)	0.236	Data Distribution	
Theta Star	81.97	Data appear Lognormal at 5% Significance Level	
MLE of Mean	19.39		
MLE of Standard Deviation	39.86		
nu star	12.3		
Approximate Chi Square Value (.05)	5.424	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	42.59
Adjusted Chi Square Value	5.124	95% Jackknife UCL	43.49
		95% Standard Bootstrap UCL	42.85
Anderson-Darling Test Statistic	2.014	95% Bootstrap-t UCL	184.9
Anderson-Darling 5% Critical Value	0.878	95% Hall's Bootstrap UCL	132.3
Kolmogorov-Smirnov Test Statistic	0.224	95% Percentile Bootstrap UCL	46.86
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	62.64
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	80.88
		97.5% Chebyshev(Mean, Sd) UCL	107.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	159.8
95% Approximate Gamma UCL	43.95		
95% Adjusted Gamma UCL	46.53		

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 159.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.032	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-3.442
Mean	8.811	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.95
SD	2.7	SD of log Data	1.162
Coefficient of Variation	0.306		
Skewness	-2.533		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.498	Shapiro Wilk Test Statistic	0.345
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.716	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	25.99
95% Adjusted-CLT UCL (Chen-1995)	9.401	95% Chebyshev (MVUE) UCL	28.7
95% Modified-t UCL (Johnson-1978)	9.672	97.5% Chebyshev (MVUE) UCL	35.39
		99% Chebyshev (MVUE) UCL	48.52

Gamma Distribution Test

k star (bias corrected)	2.122	Data Distribution	
Theta Star	4.152	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.811		
MLE of Standard Deviation	6.049		
nu star	110.3		
Approximate Chi Square Value (.05)	87.09	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9.682
Adjusted Chi Square Value	85.73	95% Jackknife UCL	9.716
		95% Standard Bootstrap UCL	9.675
Anderson-Darling Test Statistic	6.867	95% Bootstrap-t UCL	9.514
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	9.462
Kolmogorov-Smirnov Test Statistic	0.471	95% Percentile Bootstrap UCL	9.612
Kolmogorov-Smirnov 5% Critical Value	0.173	95% BCA Bootstrap UCL	9.434
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.12
		97.5% Chebyshev(Mean, Sd) UCL	12.12
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.08
95% Approximate Gamma UCL	11.16		
95% Adjusted Gamma UCL	11.34		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	11.12
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.4	Log-transformed Statistics	
Maximum	0.779	Minimum of Log Data	-0.916
Mean	0.533	Maximum of Log Data	-0.25
Median	0.533	Mean of log Data	-0.635
SD	0.0603	SD of log Data	0.106
Coefficient of Variation	0.113		
Skewness	2.189		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.446	Shapiro Wilk Test Statistic	0.475
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.553	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.553
95% Adjusted-CLT UCL (Chen-1995)	0.558	95% Chebyshev (MVUE) UCL	0.581
95% Modified-t UCL (Johnson-1978)	0.554	97.5% Chebyshev (MVUE) UCL	0.602
		99% Chebyshev (MVUE) UCL	0.643

Gamma Distribution Test

k star (bias corrected)	79.12	Data Distribution	
Theta Star	0.00674	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.533		
MLE of Standard Deviation	0.0599		
nu star	4114		
Approximate Chi Square Value (.05)	3966	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	0.552
Adjusted Chi Square Value	3956	95% Jackknife UCL	0.553
		95% Standard Bootstrap UCL	0.552
Anderson-Darling Test Statistic	6.946	95% Bootstrap-t UCL	0.558
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.668
Kolmogorov-Smirnov Test Statistic	0.447	95% Percentile Bootstrap UCL	0.552
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	0.556
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.584
		97.5% Chebyshev(Mean, Sd) UCL	0.607
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.651
95% Approximate Gamma UCL	0.553		
95% Adjusted Gamma UCL	0.554		

Potential UCL to Use		Use 95% Student's-t UCL	0.553
		or 95% Modified-t UCL	0.554

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	17
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Raw Statistics

Minimum	7.98	Log-transformed Statistics	
Maximum	6500	Minimum of Log Data	2.077
Mean	2762	Maximum of Log Data	8.78
Median	3050	Mean of log Data	6.569
SD	2071	SD of log Data	2.599
Coefficient of Variation	0.75		
Skewness	-0.212		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.871	Shapiro Wilk Test Statistic	0.68
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	3456	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	281962
95% Adjusted-CLT UCL (Chen-1995)	3413	95% Chebyshev (MVUE) UCL	53125
95% Modified-t UCL (Johnson-1978)	3454	97.5% Chebyshev (MVUE) UCL	70274
		99% Chebyshev (MVUE) UCL	103958

Gamma Distribution Test

k star (bias corrected)	0.444	Data Distribution	
Theta Star	6222	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	2762		
MLE of Standard Deviation	4146	Nonparametric Statistics	
nu star	23.09	95% CLT UCL	3431
Approximate Chi Square Value (.05)	13.16	95% Jackknife UCL	3456
Adjusted Level of Significance	0.0398	95% Standard Bootstrap UCL	3410
Adjusted Chi Square Value	12.66	95% Bootstrap-t UCL	3435
Anderson-Darling Test Statistic	3.812	95% Hall's Bootstrap UCL	3426
Anderson-Darling 5% Critical Value	0.814	95% Percentile Bootstrap UCL	3417
Kolmogorov-Smirnov Test Statistic	0.365	95% BCA Bootstrap UCL	3426
Kolmogorov-Smirnov 5% Critical Value	0.182	95% Chebyshev(Mean, Sd) UCL	4533
Data not Gamma Distributed at 5% Significance Level		97.5% Chebyshev(Mean, Sd) UCL	5299
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6804
95% Approximate Gamma UCL	4848		
95% Adjusted Gamma UCL	5037		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	6804
Recommended UCL exceeds the maximum observation			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium-238

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	3
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Raw Statistics

Minimum	1.82	Log-transformed Statistics	
Maximum	2.67	Minimum of Log Data	0.599
Mean	2.245	Maximum of Log Data	0.982
Median	2.245	Mean of log Data	0.807
SD	0.12	SD of log Data	0.0544
Coefficient of Variation	0.0535		
Skewness	2.08E-14		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.388	Shapiro Wilk Test Statistic	0.385
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	2.285
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	2.284
95% Modified-t UCL (Johnson-1978)	2.285

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	2.35
97.5% Chebyshev (MVUE) UCL	2.395
99% Chebyshev (MVUE) UCL	2.484

Gamma Distribution Test

k star (bias corrected)	315.3
Theta Star	0.00712
MLE of Mean	2.245
MLE of Standard Deviation	0.126
nu star	16394
Approximate Chi Square Value (.05)	16098
Adjusted Level of Significance	0.0398
Adjusted Chi Square Value	16078

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	2.284
95% Jackknife UCL	2.285
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	2.348
97.5% Chebyshev(Mean, Sd) UCL	2.392
99% Chebyshev(Mean, Sd) UCL	2.48

Anderson-Darling Test Statistic	7.951
Anderson-Darling 5% Critical Value	0.742
Kolmogorov-Smirnov Test Statistic	0.469
Kolmogorov-Smirnov 5% Critical Value	0.171
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.286
95% Adjusted Gamma UCL	2.289

Potential UCL to Use

Use 95% Student's-t UCL	2.285
or 95% Modified-t UCL	2.285

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options

From File	153-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9
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Raw Statistics

Minimum	5.82	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.761
Mean	8.921	Maximum of Log Data	2.398
Median	8.945	Mean of log Data	2.17
SD	1.719	SD of log Data	0.21
Coefficient of Variation	0.193		
Skewness	-0.652		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.877
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.918	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.21
95% Adjusted-CLT UCL (Chen-1995)	9.696	95% Chebyshev (MVUE) UCL	11.52
95% Modified-t UCL (Johnson-1978)	9.899	97.5% Chebyshev (MVUE) UCL	12.64
		99% Chebyshev (MVUE) UCL	14.85

Gamma Distribution Test

k star (bias corrected)	18.93	Data Distribution	
Theta Star	0.471	Data appear Normal at 5% Significance Level	
MLE of Mean	8.921		
MLE of Standard Deviation	2.05		
nu star	378.7		
Approximate Chi Square Value (.05)	334.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	9.815
Adjusted Chi Square Value	327.4	95% Jackknife UCL	9.918

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	0.519	95% Standard Bootstrap UCL	9.746
Anderson-Darling 5% Critical Value	0.725	95% Bootstrap-t UCL	9.834
Kolmogorov-Smirnov Test Statistic	0.243	95% Hall's Bootstrap UCL	9.707
Kolmogorov-Smirnov 5% Critical Value	0.266	95% Percentile Bootstrap UCL	9.758
Data appear Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.693
		95% Chebyshev(Mean, Sd) UCL	11.29
		97.5% Chebyshev(Mean, Sd) UCL	12.32
		99% Chebyshev(Mean, Sd) UCL	14.33

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.1
95% Adjusted Gamma UCL	10.32

Potential UCL to Use

Use 95% Student's-t UCL	9.918
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	8
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Raw Statistics

Minimum	41.27	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	3.72
Mean	61.95	Maximum of Log Data	4.443
Median	62.78	Mean of log Data	4.086
SD	18.38	SD of log Data	0.302
Coefficient of Variation	0.297		
Skewness	0.207		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.849	Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	72.61	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	76.02
95% Adjusted-CLT UCL (Chen-1995)	71.92	95% Chebyshev (MVUE) UCL	88
95% Modified-t UCL (Johnson-1978)	72.67	97.5% Chebyshev (MVUE) UCL	99.25
		99% Chebyshev (MVUE) UCL	121.4

Gamma Distribution Test

k star (bias corrected)	8.794	Data Distribution	
Theta Star	7.045	Data appear Normal at 5% Significance Level	
MLE of Mean	61.95		
MLE of Standard Deviation	20.89		
nu star	175.9		
Approximate Chi Square Value (.05)	146.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	71.51
Adjusted Chi Square Value	141.5	95% Jackknife UCL	72.61
		95% Standard Bootstrap UCL	71.14
Anderson-Darling Test Statistic	0.62	95% Bootstrap-t UCL	72.56
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	70.39
Kolmogorov-Smirnov Test Statistic	0.198	95% Percentile Bootstrap UCL	71.04
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	70.95
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	87.28
		97.5% Chebyshev(Mean, Sd) UCL	98.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	119.8
95% Approximate Gamma UCL	74.53		
95% Adjusted Gamma UCL	77		

Potential UCL to Use		Use 95% Student's-t UCL	72.61
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10
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Raw Statistics

Minimum	109.9	Log-transformed Statistics	
Maximum	1018	Minimum of Log Data	4.699
Mean	362.2	Maximum of Log Data	6.926
Median	322.3	Mean of log Data	5.654
SD	274.1	SD of log Data	0.731
Coefficient of Variation	0.757		
Skewness	1.614		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	521	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	699.8
95% Adjusted-CLT UCL (Chen-1995)	552	95% Chebyshev (MVUE) UCL	736.9
95% Modified-t UCL (Johnson-1978)	528.4	97.5% Chebyshev (MVUE) UCL	899.6
		99% Chebyshev (MVUE) UCL	1219

Gamma Distribution Test

k star (bias corrected)	1.644	Data Distribution	
Theta Star	220.3	Data appear Gamma Distributed at 5% Significance Level	
MLE of Mean	362.2		
MLE of Standard Deviation	282.5		
nu star	32.87		
Approximate Chi Square Value (.05)	20.77	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	504.7
Adjusted Chi Square Value	19.11	95% Jackknife UCL	521
		95% Standard Bootstrap UCL	497.6
Anderson-Darling Test Statistic	0.35	95% Bootstrap-t UCL	603.6
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	1120
Kolmogorov-Smirnov Test Statistic	0.163	95% Percentile Bootstrap UCL	503.7
Kolmogorov-Smirnov 5% Critical Value	0.269	95% BCA Bootstrap UCL	564.7
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	739.9
		97.5% Chebyshev(Mean, Sd) UCL	903.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1224
95% Approximate Gamma UCL	573.3		
95% Adjusted Gamma UCL	623		

Potential UCL to Use		Use 95% Approximate Gamma UCL	573.3
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	6
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Raw Statistics

Minimum	13.2	Log-transformed Statistics	
Maximum	99.22	Minimum of Log Data	2.58
Mean	62.73	Maximum of Log Data	4.597
Median	65	Mean of log Data	3.996
SD	26.91	SD of log Data	0.653
Coefficient of Variation	0.429		
Skewness	-0.896		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.853	Shapiro Wilk Test Statistic	0.732
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	78.33	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	114.8
95% Adjusted-CLT UCL (Chen-1995)	74.15	95% Chebyshev (MVUE) UCL	126.4
95% Modified-t UCL (Johnson-1978)	77.93	97.5% Chebyshev (MVUE) UCL	152.7
		99% Chebyshev (MVUE) UCL	204.3

Gamma Distribution Test

k star (bias corrected)	2.626	Data Distribution	
Theta Star	23.89	Data appear Normal at 5% Significance Level	
MLE of Mean	62.73		
MLE of Standard Deviation	38.71		
nu star	52.52		
Approximate Chi Square Value (.05)	36.87	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	76.73
Adjusted Chi Square Value	34.61	95% Jackknife UCL	78.33
		95% Standard Bootstrap UCL	76.54
Anderson-Darling Test Statistic	1.206	95% Bootstrap-t UCL	75.55
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	73.9
Kolmogorov-Smirnov Test Statistic	0.396	95% Percentile Bootstrap UCL	75.18
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	74.25
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	99.83
		97.5% Chebyshev(Mean, Sd) UCL	115.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	147.4
95% Approximate Gamma UCL	89.35		
95% Adjusted Gamma UCL	95.2		

Potential UCL to Use

Use 95% Student's-t UCL 78.33

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB, Total

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	4
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Raw Statistics

Minimum	0.35	Log-transformed Statistics	
Maximum	5	Minimum of Log Data	-1.05
Mean	3.633	Maximum of Log Data	1.609
Median	5	Mean of log Data	0.874
SD	2.202	SD of log Data	1.192
Coefficient of Variation	0.606		
Skewness	-1.038		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.603	Shapiro Wilk Test Statistic	0.625
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	4.909	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	19.69
95% Adjusted-CLT UCL (Chen-1995)	4.534	95% Chebyshev (MVUE) UCL	12.02
95% Modified-t UCL (Johnson-1978)	4.871	97.5% Chebyshev (MVUE) UCL	15.32
		99% Chebyshev (MVUE) UCL	21.8

Gamma Distribution Test

k star (bias corrected)	1.007	Data Distribution	
Theta Star	3.608	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	3.633		
MLE of Standard Deviation	3.62		
nu star	20.14		
Approximate Chi Square Value (.05)	10.95	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	4.778
Adjusted Chi Square Value	9.797	95% Jackknife UCL	4.909

Anderson-Darling Test Statistic

Anderson-Darling 5% Critical Value	0.742	95% Standard Bootstrap UCL	4.665
Kolmogorov-Smirnov Test Statistic	0.45	95% Bootstrap-t UCL	4.489
Kolmogorov-Smirnov 5% Critical Value	0.272	95% Hall's Bootstrap UCL	4.366
Data not Gamma Distributed at 5% Significance Level		95% Percentile Bootstrap UCL	4.538
		95% BCA Bootstrap UCL	4.538
		95% Chebyshev(Mean, Sd) UCL	6.668
		97.5% Chebyshev(Mean, Sd) UCL	7.982
		99% Chebyshev(Mean, Sd) UCL	10.56

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.679
95% Adjusted Gamma UCL	7.468

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 95% Chebyshev (Mean, Sd) UCL	6.668
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	5
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Raw Statistics

Minimum	0.021	Log-transformed Statistics	
Maximum	13.17	Minimum of Log Data	-3.863
Mean	8.562	Maximum of Log Data	2.578
Median	10	Mean of log Data	1.167
SD	4.642	SD of log Data	2.529
Coefficient of Variation	0.542		
Skewness	-1.487		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.695	Shapiro Wilk Test Statistic	0.552
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	11.25	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	22097
95% Adjusted-CLT UCL (Chen-1995)	10.24	95% Chebyshev (MVUE) UCL	152.4
95% Modified-t UCL (Johnson-1978)	11.14	97.5% Chebyshev (MVUE) UCL	203.3
		99% Chebyshev (MVUE) UCL	303.2

Gamma Distribution Test

k star (bias corrected)	0.505	Data Distribution	
Theta Star	16.96	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.562		
MLE of Standard Deviation	12.05		
nu star	10.1		
Approximate Chi Square Value (.05)	4.004	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	10.98
Adjusted Chi Square Value	3.364	95% Jackknife UCL	11.25
		95% Standard Bootstrap UCL	10.81
Anderson-Darling Test Statistic	2.537	95% Bootstrap-t UCL	10.55
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	10.26
Kolmogorov-Smirnov Test Statistic	0.508	95% Percentile Bootstrap UCL	10.72
Kolmogorov-Smirnov 5% Critical Value	0.278	95% BCA Bootstrap UCL	10.56
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.96
		97.5% Chebyshev(Mean, Sd) UCL	17.73
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	23.17
95% Approximate Gamma UCL	21.6		
95% Adjusted Gamma UCL	25.71		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 99% Chebyshev (Mean, Sd) UCL	23.17
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.0083	Log-transformed Statistics	
Maximum	0.0869	Minimum of Log Data	-4.791
Mean	0.0476	Maximum of Log Data	-2.443
Median	0.0476	Mean of log Data	-3.159
SD	0.0185	SD of log Data	0.604
Coefficient of Variation	0.389		
Skewness	1.3E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.659	Shapiro Wilk Test Statistic	0.554
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.0583	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.0822
95% Adjusted-CLT UCL (Chen-1995)	0.0572	95% Chebyshev (MVUE) UCL	0.0925
95% Modified-t UCL (Johnson-1978)	0.0583	97.5% Chebyshev (MVUE) UCL	0.111
		99% Chebyshev (MVUE) UCL	0.147

Gamma Distribution Test

k star (bias corrected)	3.236	Data Distribution	
Theta Star	0.0147	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0476		
MLE of Standard Deviation	0.0265		
nu star	64.72		
Approximate Chi Square Value (.05)	47.21	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.0572
Adjusted Chi Square Value	44.62	95% Jackknife UCL	0.0583

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.192	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.729	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.463	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.268	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.0731
		97.5% Chebyshev(Mean, Sd) UCL	0.0842
		99% Chebyshev(Mean, Sd) UCL	0.106

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0653
95% Adjusted Gamma UCL	0.069

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	0.0731
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 153-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

PCB, Total

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 3

Raw Statistics

Minimum	0.35	Log-transformed Statistics	
Maximum	0.6	Minimum of Log Data	-1.05
Mean	0.475	Maximum of Log Data	-0.511
Median	0.475	Mean of log Data	-0.752
SD	0.0589	SD of log Data	0.128
Coefficient of Variation	0.124		
Skewness	1.77E-15		

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.659	Shapiro Wilk Test Statistic	0.65
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.509	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.514
95% Adjusted-CLT UCL (Chen-1995)	0.506	95% Chebyshev (MVUE) UCL	0.559
95% Modified-t UCL (Johnson-1978)	0.509	97.5% Chebyshev (MVUE) UCL	0.595
		99% Chebyshev (MVUE) UCL	0.667

Gamma Distribution Test

k star (bias corrected)	48.95	Data Distribution	
Theta Star	0.0097	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.475		
MLE of Standard Deviation	0.0679		
nu star	979		
Approximate Chi Square Value (.05)	907.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.506
Adjusted Chi Square Value	895.4	95% Jackknife UCL	0.509

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.024	95% Standard Bootstrap UCL	N/A
Anderson-Darling 5% Critical Value	0.724	95% Bootstrap-t UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.416	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.266	95% Percentile Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	N/A
		95% Chebyshev(Mean, Sd) UCL	0.556
		97.5% Chebyshev(Mean, Sd) UCL	0.591
		99% Chebyshev(Mean, Sd) UCL	0.66

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.512
95% Adjusted Gamma UCL	0.519

Potential UCL to Use

Use 95% Student's-t UCL	0.509
or 95% Modified-t UCL	0.509

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.
 Total PAH

General Statistics

Number of Valid Observations 10 Number of Distinct Observations 1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
 ProUCL (or any other software) should not be used on such a data set!
 The data set for variable Total PAH was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General UCL Statistics for Full Data Sets

User Selected Options

From File	163-01.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	13
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Raw Statistics

Minimum	5.78	Log-transformed Statistics	
Maximum	11	Minimum of Log Data	1.754
Mean	9.346	Maximum of Log Data	2.398
Median	11	Mean of log Data	2.212
SD	1.95	SD of log Data	0.225
Coefficient of Variation	0.209		
Skewness	-0.509		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.763	Shapiro Wilk Test Statistic	0.775
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.999	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	10.14
95% Adjusted-CLT UCL (Chen-1995)	9.934	95% Chebyshev (MVUE) UCL	11.17
95% Modified-t UCL (Johnson-1978)	9.992	97.5% Chebyshev (MVUE) UCL	11.96
		99% Chebyshev (MVUE) UCL	13.5

Gamma Distribution Test

k star (bias corrected)	19.29	Data Distribution	
Theta Star	0.484	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	9.346		
MLE of Standard Deviation	2.128		
nu star	1003		
Approximate Chi Square Value (.05)	930.6	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9.975
Adjusted Chi Square Value	926	95% Jackknife UCL	9.999
		95% Standard Bootstrap UCL	9.965

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	2.727	95% Bootstrap-t UCL	9.973
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	9.915
Kolmogorov-Smirnov Test Statistic	0.341	95% Percentile Bootstrap UCL	9.967
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	9.897
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.01

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.07	97.5% Chebyshev(Mean, Sd) UCL	11.73
95% Adjusted Gamma UCL	10.12	99% Chebyshev(Mean, Sd) UCL	13.15

Potential UCL to Use

Use 95% Student's-t UCL	9.999
or 95% Modified-t UCL	9.992

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	17
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Raw Statistics

Minimum	15.9	Log-transformed Statistics	
Maximum	85	Minimum of Log Data	2.766
Mean	58.56	Maximum of Log Data	4.443
Median	50.65	Mean of log Data	3.985
SD	22.9	SD of log Data	0.443
Coefficient of Variation	0.391		
Skewness	0.0518		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.84	Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	66.23	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	70.28
95% Adjusted-CLT UCL (Chen-1995)	65.99	95% Chebyshev (MVUE) UCL	82.15
95% Modified-t UCL (Johnson-1978)	66.24	97.5% Chebyshev (MVUE) UCL	92.14
		99% Chebyshev (MVUE) UCL	111.8

Gamma Distribution Test

k star (bias corrected)	5.356	Data Distribution	
Theta Star	10.93	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	58.56		
MLE of Standard Deviation	25.3		
nu star	278.5		
Approximate Chi Square Value (.05)	240.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	65.95
Adjusted Chi Square Value	238.6	95% Jackknife UCL	66.23
		95% Standard Bootstrap UCL	65.76
Anderson-Darling Test Statistic	1.371	95% Bootstrap-t UCL	66.7
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	65.75
Kolmogorov-Smirnov Test Statistic	0.25	95% Percentile Bootstrap UCL	66.03
Kolmogorov-Smirnov 5% Critical Value	0.171	95% BCA Bootstrap UCL	65.66
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.13
		97.5% Chebyshev(Mean, Sd) UCL	86.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	103.2
95% Approximate Gamma UCL	67.71		
95% Adjusted Gamma UCL	68.37		

Potential UCL to Use

Use 95% Student's-t UCL	66.23
or 95% Modified-t UCL	66.24

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.0148	Log-transformed Statistics	
Maximum	10	Minimum of Log Data	-4.213
Mean	8.377	Maximum of Log Data	2.303
Median	10	Mean of log Data	1.453
SD	3.644	SD of log Data	2.037
Coefficient of Variation	0.435		
Skewness	-1.973		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.472	Shapiro Wilk Test Statistic	0.465
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.598	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	178.7
95% Adjusted-CLT UCL (Chen-1995)	9.257	95% Chebyshev (MVUE) UCL	90.99
95% Modified-t UCL (Johnson-1978)	9.552	97.5% Chebyshev (MVUE) UCL	118.4
		99% Chebyshev (MVUE) UCL	172.1

Gamma Distribution Test

k star (bias corrected)	0.798	Data Distribution	
Theta Star	10.5	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.377		
MLE of Standard Deviation	9.378		
nu star	41.5		
Approximate Chi Square Value (.05)	27.73	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9.553
Adjusted Chi Square Value	26.99	95% Jackknife UCL	9.598

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	7.784	95% Standard Bootstrap UCL	9.481
Anderson-Darling 5% Critical Value	0.779	95% Bootstrap-t UCL	9.317
Kolmogorov-Smirnov Test Statistic	0.509	95% Hall's Bootstrap UCL	9.31
Kolmogorov-Smirnov 5% Critical Value	0.177	95% Percentile Bootstrap UCL	9.521
Data not Gamma Distributed at 5% Significance Level		95% BCA Bootstrap UCL	9.239
		95% Chebyshev(Mean, Sd) UCL	11.49
		97.5% Chebyshev(Mean, Sd) UCL	12.84
		99% Chebyshev(Mean, Sd) UCL	15.49

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.54
95% Adjusted Gamma UCL	12.88

Potential UCL to Use

Recommended UCL exceeds the maximum observation	Use 97.5% Chebyshev (Mean, Sd) UCL	12.84
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics			
Number of Valid Observations	26	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	5.5	Minimum of Log Data	1.705
Maximum	78.08	Maximum of Log Data	4.358
Mean	60.05	Mean of log Data	3.987
Median	65	SD of log Data	0.607
SD	17.97		
Coefficient of Variation	0.299		
Skewness	-2.373		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.556	Shapiro Wilk Test Statistic	0.465
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	66.07	95% H-UCL	83.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.58
95% Adjusted-CLT UCL (Chen-1995)	64.09	97.5% Chebyshev (MVUE) UCL	114.9
95% Modified-t UCL (Johnson-1978)	65.79	99% Chebyshev (MVUE) UCL	144.9
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.258	Data do not follow a Discernable Distribution (0.05)	
Theta Star	14.1		
MLE of Mean	60.05		
MLE of Standard Deviation	29.1		
nu star	221.4		
Approximate Chi Square Value (.05)	188	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	65.84
Adjusted Chi Square Value	186	95% Jackknife UCL	66.07
		95% Standard Bootstrap UCL	65.61
Anderson-Darling Test Statistic	6.375	95% Bootstrap-t UCL	65.04
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	64.6
Kolmogorov-Smirnov Test Statistic	0.469	95% Percentile Bootstrap UCL	65.3
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	64.82
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	75.41
		97.5% Chebyshev(Mean, Sd) UCL	82.06
		99% Chebyshev(Mean, Sd) UCL	95.12
Assuming Gamma Distribution			
95% Approximate Gamma UCL	70.73		
95% Adjusted Gamma UCL	71.5		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	75.41

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.025	Log-transformed Statistics	
Maximum	10.53	Minimum of Log Data	-3.689
Mean	8.639	Maximum of Log Data	2.354
Median	10	Mean of log Data	1.6
SD	3.384	SD of log Data	1.886
Coefficient of Variation	0.392		
Skewness	-2.185		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.46	Shapiro Wilk Test Statistic	0.411
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.773	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	124.1
95% Adjusted-CLT UCL (Chen-1995)	9.427	95% Chebyshev (MVUE) UCL	77.03
95% Modified-t UCL (Johnson-1978)	9.726	97.5% Chebyshev (MVUE) UCL	99.57
		99% Chebyshev (MVUE) UCL	143.8

Gamma Distribution Test

k star (bias corrected)	0.94	Data Distribution	
Theta Star	9.187	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	8.639		
MLE of Standard Deviation	8.909		
nu star	48.9		
Approximate Chi Square Value (.05)	33.85	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	9.731
Adjusted Chi Square Value	33.02	95% Jackknife UCL	9.773
		95% Standard Bootstrap UCL	9.672
Anderson-Darling Test Statistic	8.109	95% Bootstrap-t UCL	9.505
Anderson-Darling 5% Critical Value	0.773	95% Hall's Bootstrap UCL	9.477
Kolmogorov-Smirnov Test Statistic	0.531	95% Percentile Bootstrap UCL	9.637
Kolmogorov-Smirnov 5% Critical Value	0.176	95% BCA Bootstrap UCL	9.616
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.53
		97.5% Chebyshev(Mean, Sd) UCL	12.78
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.24
95% Approximate Gamma UCL	12.48		
95% Adjusted Gamma UCL	12.79		

Potential UCL to Use

Recommended UCL exceeds the maximum observation		Use 95% Chebyshev (Mean, Sd) UCL	11.53
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	6
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Raw Statistics

Minimum	0.0052	Log-transformed Statistics	
Maximum	0.285	Minimum of Log Data	-5.259
Mean	0.0644	Maximum of Log Data	-1.255
Median	0.0644	Mean of log Data	-2.997
SD	0.0494	SD of log Data	0.839
Coefficient of Variation	0.766		
Skewness	3.624		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.448	Shapiro Wilk Test Statistic	0.594
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.081	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	0.105
95% Adjusted-CLT UCL (Chen-1995)	0.0877	95% Chebyshev (MVUE) UCL	0.125
95% Modified-t UCL (Johnson-1978)	0.0821	97.5% Chebyshev (MVUE) UCL	0.149
		99% Chebyshev (MVUE) UCL	0.196

Gamma Distribution Test

k star (bias corrected)	1.897	Data Distribution	
Theta Star	0.034	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	0.0644		
MLE of Standard Deviation	0.0468		
nu star	98.65		
Approximate Chi Square Value (.05)	76.74	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	0.0803
Adjusted Chi Square Value	75.46	95% Jackknife UCL	0.081
		95% Standard Bootstrap UCL	0.08
Anderson-Darling Test Statistic	5.472	95% Bootstrap-t UCL	0.0909
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	0.153
Kolmogorov-Smirnov Test Statistic	0.438	95% Percentile Bootstrap UCL	0.0814
Kolmogorov-Smirnov 5% Critical Value	0.173	95% BCA Bootstrap UCL	0.0902
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.107
		97.5% Chebyshev(Mean, Sd) UCL	0.125
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.161
95% Approximate Gamma UCL	0.0828		
95% Adjusted Gamma UCL	0.0842		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.107
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	4
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Raw Statistics

Minimum	27	Log-transformed Statistics	
Maximum	37.5	Minimum of Log Data	3.296
Mean	31.5	Maximum of Log Data	3.624
Median	31.5	Mean of log Data	3.448
SD	1.849	SD of log Data	0.0587
Coefficient of Variation	0.0587		
Skewness	0.416		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.558	Shapiro Wilk Test Statistic	0.559
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	32.12
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	32.13
95% Modified-t UCL (Johnson-1978)	32.12

Assuming Lognormal Distribution

95% H-UCL N/A	
95% Chebyshev (MVUE) UCL	33.08
97.5% Chebyshev (MVUE) UCL	33.77
99% Chebyshev (MVUE) UCL	35.11

Gamma Distribution Test

k star (bias corrected)	267.8
Theta Star	0.118
MLE of Mean	31.5
MLE of Standard Deviation	1.925
nu star	13924
Approximate Chi Square Value (.05)	13650
Adjusted Level of Significance	0.0398
Adjusted Chi Square Value	13633

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	32.1
95% Jackknife UCL	32.12
95% Standard Bootstrap UCL	32.08
95% Bootstrap-t UCL	32.15
95% Hall's Bootstrap UCL	32.4
95% Percentile Bootstrap UCL	32.08
95% BCA Bootstrap UCL	32.08
95% Chebyshev(Mean, Sd) UCL	33.08
97.5% Chebyshev(Mean, Sd) UCL	33.76
99% Chebyshev(Mean, Sd) UCL	35.11

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	6.062
Anderson-Darling 5% Critical Value	0.742
Kolmogorov-Smirnov Test Statistic	0.431
Kolmogorov-Smirnov 5% Critical Value	0.171

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	32.13
95% Adjusted Gamma UCL	32.17

Potential UCL to Use

Use 95% Student's-t UCL	32.12
or 95% Modified-t UCL	32.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Full Data Sets

User Selected Options
 From File 163-01.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Chromium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	4
Raw Statistics		Log-transformed Statistics	
Minimum	7.26	Minimum of Log Data	1.982
Maximum	85	Maximum of Log Data	4.443
Mean	47.23	Mean of log Data	3.807
Median	47.23	SD of log Data	0.39
SD	11.01		
Coefficient of Variation	0.233		
Skewness	-0.325		

Warning: There are only 4 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.403	Shapiro Wilk Test Statistic	0.318
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	50.92	Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)		95% H-UCL	56.24
95% Adjusted-CLT UCL (Chen-1995)	50.64	95% Chebyshev (MVUE) UCL	64.99
95% Modified-t UCL (Johnson-1978)	50.9	97.5% Chebyshev (MVUE) UCL	72.15
		99% Chebyshev (MVUE) UCL	86.22

Gamma Distribution Test

k star (bias corrected)	9.449	Data Distribution	
Theta Star	4.999	Data do not follow a Discernable Distribution (0.05)	
MLE of Mean	47.23		
MLE of Standard Deviation	15.37		
nu star	491.3		
Approximate Chi Square Value (.05)	440.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0398	95% CLT UCL	50.78
Adjusted Chi Square Value	437.8	95% Jackknife UCL	50.92
		95% Standard Bootstrap UCL	50.77
		95% Bootstrap-t UCL	50.35
		95% Hall's Bootstrap UCL	51.48
		95% Percentile Bootstrap UCL	50.31
		95% BCA Bootstrap UCL	50.22
		95% Chebyshev(Mean, Sd) UCL	56.64
		97.5% Chebyshev(Mean, Sd) UCL	60.71
		99% Chebyshev(Mean, Sd) UCL	68.71

Anderson-Darling Test Statistic

Anderson-Darling Test Statistic	7.941		
Anderson-Darling 5% Critical Value	0.744		
Kolmogorov-Smirnov Test Statistic	0.502		
Kolmogorov-Smirnov 5% Critical Value	0.171		
Data not Gamma Distributed at 5% Significance Level			

Assuming Gamma Distribution

95% Approximate Gamma UCL	52.63		
95% Adjusted Gamma UCL	53.01		

Potential UCL to Use

	Use 95% Student's-t UCL	50.92
	or 95% Modified-t UCL	50.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Total PAH

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	3
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Raw Statistics

Minimum	0.016
Maximum	0.285
Mean	0.151
Median	0.151
SD	0.0381
Coefficient of Variation	0.253
Skewness	-5.8E-15

Log-transformed Statistics

Minimum of Log Data	-4.135
Maximum of Log Data	-1.255
Mean of Log Data	-1.955
SD of log Data	0.462

Warning: There are only 3 Distinct Values in this data
 There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.
 Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.
 However, results obtained using 4 to 9 distinct values may not be reliable.
 It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.388	Shapiro Wilk Test Statistic	0.302
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	0.163
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	0.163
95% Modified-t UCL (Johnson-1978)	0.163

Assuming Lognormal Distribution

95% H-UCL	0.188
95% Chebyshev (MVUE) UCL	0.221
97.5% Chebyshev (MVUE) UCL	0.249
99% Chebyshev (MVUE) UCL	0.303

Gamma Distribution Test

k star (bias corrected)	7.344
Theta Star	0.0205
MLE of Mean	0.151
MLE of Standard Deviation	0.0555
nu star	381.9
Approximate Chi Square Value (.05)	337.6
Adjusted Level of Significance	0.0398
Adjusted Chi Square Value	334.8
Anderson-Darling Test Statistic	8.17
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.508
Kolmogorov-Smirnov 5% Critical Value	0.171
Data not Gamma Distributed at 5% Significance Level	

Data Distribution
 Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.163
95% Jackknife UCL	0.163
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.183
97.5% Chebyshev(Mean, Sd) UCL	0.197
99% Chebyshev(Mean, Sd) UCL	0.225

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.17
95% Adjusted Gamma UCL	0.172

Potential UCL to Use

Use 95% Student's-t UCL	0.163
or 95% Modified-t UCL	0.163

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
 and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

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ATTACHMENT D4
TOXICITY VALUES

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Table D4.1. Toxicity Values and Information Used in Soils OU Risk Analysis

Chemical Abstract Number	Analyte	GI Absorption Factor (Unitless)	Oral RfD (RfDo)	Absorbed Dose (RfDd)	Inhalation (RfCi)	Inhalation (RfDi)	Oral Slope Factor (SFo)	Oral Slope Factor for Water (SFow)	Oral Slope Factor for Soil (SFos)	Absorbed Dose Slope Factor (SFd)	Inhalation Slope Factor (SFi)	External Exposure Slope Factor (SFe)	Volatile Organic?	PEF Res.	PEF Ind./Comm.	VF Res.	VF Ind./Comm.	KY Default ABS (Unitless)	Permeability Constant
7429905	Aluminum	1.00E+00	1.00E+00	1.00E+00	5.00E-03	1.43E-03								9.30E+08	6.20E+08			0.05	1.00E-03
7440360	Antimony (metallic)	1.50E-01	4.00E-04	6.00E-05										9.30E+08	6.20E+08			0.05	1.00E-03
7440382	Arsenic, Inorganic	1.00E+00	3.00E-04	3.00E-04	1.50E-05	4.29E-06	1.50E+00			1.50E+00	1.51E+01			9.30E+08	6.20E+08			0.03	1.00E-03
7440393	Barium	7.00E-02	2.00E-01	1.40E-02	5.00E-04	1.43E-04								9.30E+08	6.20E+08			0.05	1.00E-03
7440417	Beryllium and compounds	7.00E-03	2.00E-03	1.40E-05	2.00E-05	5.71E-06					8.40E+00			9.30E+08	6.20E+08			0.007	1.00E-03
7440428	Boron And Borates Only	1.00E+00	2.00E-01	2.00E-01	2.00E-02	5.71E-03								9.30E+08	6.20E+08			0.05	1.00E-03
7440439	Cadmium (Diet)	2.50E-02	1.00E-03	2.50E-05	1.00E-05	2.86E-06	3.80E-01				6.30E+00			9.30E+08	6.20E+08			0.001	1.00E-03
7440439	Cadmium (Water)	5.00E-02	5.00E-04	2.50E-05	1.00E-05	2.86E-06	3.80E-01				6.30E+00			9.30E+08	6.20E+08			0.001	1.00E-03
7440473	Chromium (Total)	0.013	1.50E+00	1.95E-02							2.94E+02			9.30E+08	6.20E+08			0.05	1.00E-03
7440484	Cobalt	1.00E+00	3.00E-04	3.00E-04	6.00E-06	1.71E-06					3.15E+01			9.30E+08	6.20E+08			0.05	4.00E-04
7440508	Copper	1.00E+00	4.00E-02	4.00E-02										9.30E+08	6.20E+08			0.05	1.00E-03
7439896	Iron	1.00E+00	7.00E-01	7.00E-01										9.30E+08	6.20E+08			0.05	1.00E-03
7439965	Manganese (Diet)	1.00E+00	1.40E-01	1.40E-01	5.00E-05	1.43E-05								9.30E+08	6.20E+08			0.04	1.00E-03
7439965	Manganese (Water)	4.00E-02	2.40E-02	9.60E-04	5.00E-05	1.43E-05								9.30E+08	6.20E+08			0.04	1.00E-03
7439976	Mercury, Inorganic Salts	7.00E-02	3.00E-04	2.10E-05										9.30E+08	6.20E+08	3.10E+04	2.08E+04	0.05	1.00E-03
7439987	Molybdenum	1.00E+00	5.00E-03	5.00E-03										9.30E+08	6.20E+08			0.05	1.00E-03
7440020	Nickel Soluble Salts	4.00E-02	2.00E-02	8.00E-04	9.00E-05	2.57E-05					9.10E-01			9.30E+08	6.20E+08			0.04	2.00E-04
7782492	Selenium	1.00E+00	5.00E-03	5.00E-03	2.00E-02	5.71E-03								9.30E+08	6.20E+08			0.05	1.00E-03
7440224	Silver	4.00E-02	5.00E-03	2.00E-04										9.30E+08	6.20E+08			0.04	6.00E-04
7791120	Thallium Chloride	1.00E+00	8.00E-05	8.00E-05										9.30E+08	6.20E+08			0.05	1.00E-03
238	Uranium (Soluble Salts)	1.00E+00	3.00E-03	3.00E-03	3.00E-04	8.57E-05								9.30E+08	6.20E+08			0.05	1.00E-03
	Vanadium and Compounds	1.00E+00	5.00E-03	5.00E-03										9.30E+08	6.20E+08			0.026	1.00E-03
7440666	Zinc (Metallic)	1.00E+00	3.00E-01	3.00E-01										9.30E+08	6.20E+08			0.05	6.00E-04
83329	Acenaphthene	1.00E+00	6.00E-02	6.00E-02	2.09E-01	5.97E-02							YES	9.30E+08	6.20E+08	8.38E+04	5.62E+04	0.13	8.60E-02
208968	Acenaphthylene	1.00E+00											YES	9.30E+08	6.20E+08	1.13E+05	7.57E+04	0.25	9.11E-02
107131	Acrylonitrile	1.00E+00	4.00E-02	4.00E-02	2.00E-03	5.71E-04	5.40E-01			5.40E-01	2.38E-01		YES	9.30E+08	6.20E+08	6.95E+03	4.66E+03	0.25	1.16E-03
120127	Anthracene	1.00E+00	3.00E-01	3.00E-01	1.05E+00	3.00E-01							YES	9.30E+08	6.20E+08	3.11E+05	2.09E+05	0.13	1.42E-01
71432	Benzene	1.00E+00	4.00E-03	4.00E-03	3.00E-02	8.57E-03	5.50E-02			5.50E-02	2.73E-02		YES	9.30E+08	6.20E+08	2.37E+03	1.59E+03	0.25	1.49E-02
86748	Carbazole	1.00E+00					2.00E-02			2.00E-02				9.30E+08	6.20E+08	2.00E+06	1.34E+06	0.1	5.36E-02
56235	Carbon Tetrachloride	1.00E+00	4.00E-03	4.00E-03	1.00E-01	2.86E-02	7.00E-02			7.00E-02	2.10E-02		YES	9.30E+08	6.20E+08	1.28E+03	8.57E+02	0.25	1.63E-02
67663	Chloroform	1.00E+00	1.00E-02	1.00E-02	9.77E-02	2.79E-02	3.10E-02			3.10E-02	8.05E-02		YES	9.30E+08	6.20E+08	2.09E+03	1.40E+03	0.25	6.83E-03
75354	Dichloroethylene, 1,1-	1.00E+00	5.00E-02	5.00E-02	2.00E-01	5.71E-02	6.00E-01			6.00E-01	1.75E-01		YES	9.30E+08	6.20E+08	1.02E+03	6.84E+02	0.25	1.17E-02
540590	Dichloroethylene, 1,2- (Mixed Isomers)	1.00E+00	9.00E-03	9.00E-03	3.14E-02	8.97E-03							YES	9.30E+08	6.20E+08	1.92E+03	1.29E+03	0.25	1.10E-02
156592	Dichloroethylene, 1,2-cis-	1.00E+00	2.00E-03	2.00E-03	3.49E-02	9.97E-03							YES	9.30E+08	6.20E+08	1.94E+03	1.30E+03	0.25	1.10E-02
156605	Dichloroethylene, 1,2-trans-	1.00E+00	2.00E-02	2.00E-02	6.00E-02	1.71E-02							YES	9.30E+08	6.20E+08	1.95E+03	1.31E+03	0.25	1.10E-02
60571	Dieldrin	1.00E+00	5.00E-05	5.00E-05			1.60E+01			1.60E+01	1.61E+01			9.30E+08	6.20E+08	1.36E+06	9.16E+05	0.1	3.26E-02
1746016	Dioxins/Furans (Total)	1.00E+00	1.00E-09	1.00E-09	4.00E-08	1.14E-08	1.30E+05			1.30E+05	1.33E+05			9.30E+08	6.20E+08	1.61E+06	1.08E+06	0.03	8.08E-01
100414	Ethylbenzene	1.00E+00	1.00E-01	1.00E-01	1.00E+00	2.86E-01	1.10E-02			1.10E-02	8.75E-03		YES	9.30E+08	6.20E+08	3.55E+03	2.38E+03	0.25	4.93E-02
206440	Fluoranthene	1.00E+00	4.00E-02	4.00E-02	1.40E-01	4.00E-02								9.30E+08	6.20E+08	1.58E+06	1.06E+06	0.13	3.08E-01
86737	Fluorene	1.00E+00	4.00E-02	4.00E-02	1.40E-01	4.00E-02							YES	9.30E+08	6.20E+08	1.67E+05	1.12E+05	0.13	1.10E-01
118741	Hexachlorobenzene	1.00E+00	8.00E-04	8.00E-04			1.60E+00			1.60E+00	1.61E+00			9.30E+08	6.20E+08	2.96E+04	1.99E+04	0.1	2.54E-01
37871004	HpCDD, 2,3,7,8-	1.00E+00	1.00E-07	1.00E-07	4.00E-06	1.14E-06	1.30E+03			1.30E+03	1.33E+03			9.30E+08	6.20E+08			0.03	1.81E+00
38998753	HpCDF, 2,3,7,8-	1.00E+00	1.00E-07	1.00E-07	4.00E-06	1.14E-06	1.30E+03			1.30E+03	1.33E+03			9.30E+08	6.20E+08			0.1	1.45E+00
34465468	HxCDD, 2,3,7,8-	1.00E+00	1.00E-08	1.00E-08	4.00E-07	1.14E-07	1.30E+04			1.30E+04	1.33E+04			9.30E+08	6.20E+08			0.03	2.86E+00
55684941	HxCDF, 2,3,7,8-	1.00E+00	1.00E-08	1.00E-08	4.00E-07	1.14E-07	1.30E+04			1.30E+04	1.33E+04			9.30E+08	6.20E+08			0.1	1.35E+00
91203	Naphthalene	1.00E+00	2.00E-02	2.00E-02	3.00E-03	8.57E-04					1.19E-01		YES	9.30E+08	6.20E+08	2.77E+04	1.86E+04	0.25	4.66E-02
88744	Nitroaniline, 2-	1.00E+00	1.00E-02	1.00E-02	5.00E-05	1.43E-05								9.30E+08	6.20E+08	2.68E+05	1.80E+05	0.1	4.46E-03
621647	Nitroso-di-N-propylamine, N-	1.00E+00					7.00E+00			7.00E+00	7.00E+00			9.30E+08	6.20E+08	1.13E+05	7.60E+04	0.1	2.33E-03
3268879	OCDD	1.00E+00	3.33E-06	3.33E-06	1.33E-04	3.80E-05	3.90E+01			3.90E+01	3.99E+01			9.30E+08	6.20E+08			0.03	1.16E+00
39001020	OCDF	1.00E+00	3.33E-06	3.33E-06	1.33E-04	3.80E-05	3.90E+01			3.90E+01	3.99E+01			9.30E+08	6.20E+08			0.1	2.63E+00
36088229	PeCDD, 2,3,7,8-	1.00E+00	1.00E-09	1.00E-09	4.00E-08	1.14E-08	1.30E+05			1.30E+05	1.33E+05			9.30E+08	6.20E+08			0.03	2.41E-01
57117416	PeCDF, 1,2,3,7,8-	1.00E+00	3.33E-08	3.33E-08	1.33E-06	3.80E-07	3.90E+03			3.90E+03	3.99E+03			9.30E+08	6.20E+08			0.1	6.27E-01
57117314	PeCDF, 2,3,4,7,8-	1.00E+00	3.33E-09	3.33E-09	1.33E-07	3.80E-08	3.90E+04			3.90E+04	3.99E+04			9.30E+08	6.20E+08			0.1	6.27E-01

Table D4.1. Toxicity Values and Information Used in Soils OU Risk Analysis (Continued)

Chemical Abstract Number	Analyte	GI Absorption Factor (Unitless)	Oral RfD (RfDo)	Absorbed Dose (RfDd)	Inhalation (RfCi)	Inhalation (RfDi)	Oral Slope Factor (SFo)	Oral Slope Factor for Water (SFow)	Oral Slope Factor for Soil (SFos)	Absorbed Dose Slope Factor (SFd)	Inhalation Slope Factor (SFi)	External Exposure Slope Factor (SFe)	Volatile Organic?	PEF Res.	PEF Ind./Comm.	VF Res.	VF Ind./Comm.	KY Default ABS (Unitless)	Permeability Constant
85018	Phenanthrene	1.00E+00											YES	9.30E+08	6.20E+08	3.82E+05	2.56E+05	0.25	1.44E-01
1336363	Polychlorinated Biphenyls (high risk)	1.00E+00					2.00E+00			2.00E+00	2.00E+00			9.30E+08	6.20E+08	5.48E+05	3.68E+05	0.14	5.45E-01
1336363	Polychlorinated Biphenyls (low risk)	1.00E+00					4.00E-01			4.00E-01	3.50E-01			9.30E+08	6.20E+08	5.48E+05	3.68E+05	0.14	5.45E-01
1336363	Polychlorinated Biphenyls (lowest risk)	1.00E+00					7.00E-02			7.00E-02	7.00E-02			9.30E+08	6.20E+08	5.48E+05	3.68E+05	0.14	5.45E-01
50328	Polynuclear Aromatic Hydrocarbons (Total)	1.00E+00					7.30E+00			7.30E+00	3.10E+00			9.30E+08	6.20E+08	1.27E+07	8.50E+06	0.13	
129000	Pyrene	1.00E+00	3.00E-02	3.00E-02	1.05E-01	3.00E-02							YES	9.30E+08	6.20E+08	1.41E+06	9.45E+05	0.13	2.01E-01
1746016	TCDD, 2,3,7,8-	1.00E+00	1.00E-09	1.00E-09	4.00E-08	1.14E-08	1.30E+05			1.30E+05	1.33E+05			9.30E+08	6.20E+08	1.61E+06	1.08E+06	0.03	8.08E-01
51207319	TCDF, 2,3,7,8-	1.00E+00	1.00E-08	1.00E-08	4.00E-07	1.14E-07	1.30E+04			1.30E+04	1.33E+04			9.30E+08	6.20E+08			0.1	6.57E-01
127184	Tetrachloroethylene	1.00E+00	1.00E-02	1.00E-02	2.71E-01	7.74E-02	5.40E-01			5.40E-01	2.07E-02		YES	9.30E+08	6.20E+08	1.75E+03	1.17E+03	0.25	3.34E-02
79016	Trichloroethylene	1.00E+00	3.00E-04	3.00E-04	4.00E-02	1.14E-02	3.22E-01			3.22E-01	3.22E-01		YES	9.30E+08	6.20E+08	1.68E+03	1.13E+03	0.25	1.16E-02
75014	Vinyl Chloride	1.00E+00	3.00E-03	3.00E-03	1.00E-01	2.86E-02	7.20E-01			7.20E-01	1.54E-02		YES	9.30E+08	6.20E+08	8.77E+02	5.89E+02	0.25	8.38E-03
1330207	Xylene, Mixture	1.00E+00	2.00E-01	2.00E-01	1.00E-01	2.86E-02							YES	9.30E+08	6.20E+08	3.65E+03	2.45E+03	0.25	4.71E-02
106423	Xylene, P-	1.00E+00	2.00E-01	2.00E-01	7.00E-01	2.00E-01							YES	9.30E+08	6.20E+08	3.52E+03	2.36E+03	0.25	4.93E-02
108383	Xylene, m-	1.00E+00	2.00E-01	2.00E-01	7.00E-01	2.00E-01							YES	9.30E+08	6.20E+08	3.44E+03	2.31E+03	0.25	5.32E-02
95476	Xylene, o-	1.00E+00	2.00E-01	2.00E-01	7.00E-01	2.00E-01							YES	9.30E+08	6.20E+08	4.04E+03	2.71E+03	0.25	4.71E-02
14596102	Am-241	5.00E-04						1.04E-10	2.17E-10		2.81E-08	2.76E-08		9.30E+08	6.20E+08				
10198400	Co-60	1.00E-01						1.57E-11	4.03E-11		3.58E-11	1.24E-05		9.30E+08	6.20E+08				
10045973	Cs-137+D	1.00E+00						3.04E-11	4.33E-11		1.19E-11	2.54E-06		9.30E+08	6.20E+08				
13994202	Np-237+D	5.00E-04						6.74E-11	1.62E-10		1.77E-08	7.96E-07		9.30E+08	6.20E+08				
13981163	Pu-238	5.00E-04						1.31E-10	2.72E-10		3.36E-08	7.22E-11		9.30E+08	6.20E+08				
15117483	Pu-239	5.00E-04						1.35E-10	2.76E-10		3.33E-08	2.00E-10		9.30E+08	6.20E+08				
14119336	Pu-240	5.00E-04						1.35E-10	2.77E-10		3.33E-08	6.98E-11		9.30E+08	6.20E+08				
14133767	Tc-99	5.00E-01						2.75E-12	7.66E-12		1.41E-11	8.14E-11		9.30E+08	6.20E+08				
14269637	Th-230	5.00E-04						9.10E-11	2.02E-10		2.85E-08	8.19E-10		9.30E+08	6.20E+08				
13966295	U-234	2.00E-02						7.07E-11	1.58E-10		1.14E-08	2.52E-10		9.30E+08	6.20E+08				
15117961	U-235+D	2.00E-02						7.18E-11	1.63E-10		1.01E-08	5.43E-07		9.30E+08	6.20E+08				
7440611	U-238+D	2.00E-02						8.71E-11	2.10E-10		9.35E-09	1.14E-07		9.30E+08	6.20E+08				

ATTACHMENT D5
TOXICITY PROFILES

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D5. TOXICITY PROFILES

D5.1 INORGANIC COMPOUNDS

D5.1.1 Aluminum (CAS 007429-90-5) (RAIS)

Aluminum is a silver-white, flexible metal with a vast number of uses. It makes up about 8% of the earth's crust. The aluminum content of seawater ranges from 3 to 2,400 µg/L. Aluminum metal is used as a structural material in the construction, automotive, and aircraft industries; in the production of metal alloys; and in the electrical industry in power lines, insulated cables, and wiring. Other uses of aluminum metal include cooking utensils, decorations, fencing, highway signs, cans, food packaging, foil, and dental crowns and dentures. Aluminum powder is used in paints and fireworks, and natural aluminum minerals are used in water purification, sugar refining, and in the brewing and paper industries. Aluminum borate is used in the production of glass and ceramics, and aluminum chloride is used to make rubber, lubricants, wood preservatives, and cosmetics. Aluminum chlorohydrate is the active ingredient in antiperspirants and deodorants, while aluminum hydroxide is used as a pharmaceutical to lower plasma phosphorus levels of patients with kidney failure. Until recently, aluminum has existed in forms not available to humans and most other species; however, acid rain has increased the availability of aluminum to biological systems and has resulted in destructive effects to fish and plant species. It is unknown if humans are susceptible to this increased bioavailability. It is poorly absorbed and efficiently eliminated; however, when absorption does occur, aluminum is distributed mainly in bone, liver, testes, kidneys, and brain.

The respiratory system appears to be the primary target following inhalation exposure to aluminum. Alveolar proteinosis has been observed in guinea pigs, rats, and hamsters exposed to aluminum powders. Rats and guinea pigs exposed to aluminum chlorohydrate exhibited an increase in alveolar macrophages, increased relative lung weight, and multifocal granulomatous pneumonia. Male rats exposed to aluminum (as aluminum chloride) via gavage for 6 months exhibited decreased spermatozoa counts and sperm motility and testicular histological and histochemical changes. Male rats exposed to drinking water containing aluminum (as aluminum potassium sulfate) for a lifetime exhibited increases in unspecified malignant and nonmalignant tumors, and similarly exposed female mice exhibited an increased incidence of leukemia. Rats and guinea pigs exposed via inhalation to aluminum chlorohydrate developed lung granulomas, while granulomatous foci developed in similarly exposed male hamsters.

Aluminum has been placed in the EPA weight-of-evidence classification D, not classifiable as to human carcinogenicity. No slope factors, therefore, were used in this BHHRA.

Chronic RfDs for aluminum also are available in RAIS. The oral and inhalation RfDs of 1.00E+00 and 1.43E-03 mg/(kg × day), respectively, were used in the BHHRA. The GI absorption factor is 1.0 and the corresponding absorbed dose RfD is 1.00E-01 mg/(kg × day).

D5.1.2 Antimony (CAS 007440-36-0) (RAIS)

Antimony is a naturally occurring silvery-white metal that is found in the earth's crust. Antimony ores are mined and then mixed with other metals to form antimony alloys or combined with oxygen to form antimony oxide. Little antimony is currently mined in the United States. It is brought into this country from other countries for processing; however, there are companies in the United States that produce antimony as a by-product of smelting lead and other metals. Antimony is used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is added to textiles and

plastics to prevent them from catching fire. It also is used in paints, ceramics, and fireworks, and as enamels for plastics, metal, and glass.

Metallic antimony and a few trivalent antimony compounds are the most significant regarding exposure potential and toxicity. Antimony is a common urban air pollutant, occurring at an average concentration of 0.001 $\mu\text{g}/\text{m}^3$. Exposure to antimony may occur via inhalation and by ingestion of contaminated food.

Acute oral and inhalation exposure of humans and animals to high doses of antimony or antimony-containing compounds (antimonials) may cause gastrointestinal disorders (vomiting, diarrhea), respiratory difficulties, and death at extremely high doses. Subchronic and chronic oral exposure may affect hematologic parameters. Long-term oral exposure to high doses of antimony or antimonials has been shown to adversely affect longevity in animals. Long-term occupational exposure of humans has resulted in electrocardiac disorders, respiratory disorders, and possibly increased mortality. Antimony levels for these occupational exposure evaluations ranged from 2.2 to 11.98 mg/m^3 . Based on limited data, occupational exposure of women to metallic antimony and several antimonials has been reported to have caused alterations in the menstrual cycle and an increased incidence of spontaneous abortions.

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified antimony as to its human carcinogenicity.

Chronic RfDs for antimony also are available in RAIS. The oral RfD used in the BHHRA is 4.00E-04 ($\text{mg}/\text{kg}\text{-day}$). The GI absorption factor is 0.15 and the corresponding absorbed dose RfD is 6.00E-05 ($\text{mg}/\text{kg}\text{-day}$).

D5.1.3 Arsenic (CAS 007440-38-2) (RAIS)

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds. Inorganic arsenic compounds are used mainly to preserve wood. Organic arsenic compounds are used as pesticides, primarily on cotton plants. Arsenic cannot be destroyed in the environment. It can change its form, only. Arsenic in air either will settle to the ground or will be washed out of the air by rain. Many arsenic compounds can dissolve in water. Fish and shellfish can accumulate arsenic, but the arsenic in fish is mostly in a form that is not harmful. The toxicity of inorganic arsenic depends on its valence state and also on the physical and chemical properties of the compound in which it occurs.

Water soluble inorganic arsenic compounds are absorbed through the GI tract and lungs; distributed primarily to the liver, kidney, lung, spleen, aorta, and skin; and excreted mainly in the urine at rates as high as 80%. Symptoms of acute inorganic arsenic poisoning in humans are nausea, anorexia, vomiting, epigastric and abdominal pain, and diarrhea. Dermatitis (exfoliative erythroderma), muscle cramps, cardiac abnormalities, hepatotoxicity, bone marrow suppression and hematologic abnormalities (anemia), vascular lesions, and peripheral neuropathy (motor dysfunction, paresthesia) also have been reported. Oral doses as low as 20-60 $\mu\text{g}/\text{kg}/\text{day}$ have been reported to cause toxic effects in some individuals. Severe exposures can result in acute encephalopathy, congestive heart failure, stupor, convulsions, paralysis, coma, and death. The acute lethal dose to humans has been estimated to be about 0.6 $\text{mg}/\text{kg}/\text{day}$.

General symptoms of chronic arsenic poisoning in humans are weakness, general debility and lassitude, loss of appetite and energy, loss of hair, hoarseness of voice, loss of weight, and mental disorders. Primary target organs are the skin (hyperpigmentation and hyperkeratosis), nervous system (peripheral

neuropathy), and vascular system. Anemia, leukopenia, hepatomegaly, and portal hypertension also have been reported. In addition, possible reproductive effects include a high male to female birth ratio.

Epidemiological studies have revealed an association between arsenic concentrations in drinking water and increased incidences of skin cancers, as well as cancers of the liver, bladder, respiratory, and GI tracts. Occupational exposure studies have shown a clear correlation between exposure to arsenic and lung cancer mortality. Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization, the DHHS, and the EPA have determined that inorganic arsenic is a human carcinogen and is classified A, human carcinogen.

Cancer slope factors for arsenic are available from EPA's IRIS. The values used in the BHHRA are 1.50E+00, 1.51E+01, and 1.50 E+00 [mg/(kg × day)]⁻¹ for the oral, inhalation, and dermal exposure routes, respectively. The slope factor for the dermal exposure route was calculated by assuming a GI absorption factor of 1.0.

Chronic RfDs for arsenic also are available in RAIS. The oral and dermal values used in the BHHRA were 3.00E-04 mg/(kg × day) for both. The dermal RfD was calculated by assuming a GI absorption factor of 1.0.

D5.1.4 Barium (CAS 7440-39-3) (RAIS)

The soluble salts of barium, an alkaline earth metal, are toxic in mammalian systems. They are absorbed rapidly from the gastrointestinal tract and are deposited in the muscles, lungs, and bone. Barium is excreted primarily in the feces.

At low doses, barium acts as a muscle stimulant and at higher doses affects the nervous system eventually leading to paralysis. Acute and subchronic oral doses of barium cause vomiting and diarrhea, followed by decreased heart rate and elevated blood pressure. Higher doses result in cardiac irregularities, weakness, tremors, anxiety, and dyspnea. A drop in serum potassium may account for some of the symptoms. Death can occur from cardiac and respiratory failure. Acute doses around 0.8 grams can be fatal to humans.

Subchronic and chronic oral or inhalation exposure primarily affects the cardiovascular system resulting in elevated blood pressure. A lowest-observed-adverse-effect level (LOAEL) of 0.51 mg barium/kg/day based on increased blood pressure was observed in chronic oral rat studies (Perry et al. 1983), whereas human studies identified a no-observed-adverse-effect level (NOAEL) of 0.21 mg barium/kg/day (Wones et al. 1990, Brenniman and Levy 1984). The human data were used by the EPA to calculate a chronic and subchronic oral reference dose (RfD) of 0.07 mg/kg/day (EPA 1995a,b). In the Wones et al. study, human volunteers were given barium up to 10 mg/L in drinking water for 10 weeks. No clinically significant effects were observed. An epidemiological study was conducted by Brenniman and Levy in which human populations ingesting 2 to 10 mg/L of barium in drinking water were compared to a population ingesting 0 to 0.2 mg/L. No significant individual differences were seen; however, a significantly higher mortality rate from all combined cardiovascular diseases was observed with the higher barium level in the 65+ age group. The average barium concentration was 7.3 mg/L, which corresponds to a dose of 0.20 mg/kg/day. Confidence in the oral RfD is rated medium by the EPA.

Subchronic and chronic inhalation exposure of human populations to barium-containing dust can result in a benign pneumoconiosis called "baritosis." This condition is often accompanied by an elevated blood pressure but does not result in a change in pulmonary function. Exposure to an air concentration of 5.2 mg barium carbonate/m³ for 4 hours/day for 6 months has been reported to result in elevated blood pressure and decreased body weight gain in rats (Tarasenko et al. 1977). Reproduction and developmental effects

were also observed. Increased fetal mortality was seen after untreated females were mated with males exposed to 5.2 mg/m³ of barium carbonate. Similar results were obtained with female rats treated with 13.4 mg barium carbonate/m³. The NOAEL for developmental effects was 1.15 mg/m³ (equivalent to 0.8 mg barium/m³). An inhalation reference concentration (RfC) of 0.005 mg/m³ for subchronic and 0.0005 mg/m³ for chronic exposure was calculated by the EPA based on the NOAEL for developmental effects (EPA 1995a). These effects have not been substantiated in humans or other animal systems.

Barium has not been evaluated by the EPA for evidence of human carcinogenic potential (EPA 1995b). Chronic RfDs for barium also are available in RAIS. The oral RfD used in the BHHRA is 2.00E-01 (mg/kg-day). The GI absorption factor is 7.00E-02 and the corresponding absorbed dose RfD is 1.40E-02 (mg/kg-day).

Barium References

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D5.1.5 Beryllium (CAS 007440-41-7) (RAIS)

Beryllium is a metallic element. Pure beryllium is a hard, grayish metal. In nature, beryllium can be found in compounds in mineral rocks, coal, soil, and volcanic dust. Beryllium compounds have no particular smell. Beryllium occurs naturally in the earth's crust at concentrations ranging from 2-10 ppm. It is also released into the atmosphere from coal combustion at concentrations of ~0.01-0.1 ng/m³, most likely as beryllium oxide. Beryllium occurs in house dust, surface water, food, and soil. The general population is exposed to beryllium every day. Cigarette smokers can be exposed to nearly twice the amount of beryllium as nonsmokers. Beryllium compounds are commercially mined, and the beryllium purified for use in electrical parts, machine parts, ceramics, aircraft parts, nuclear weapons, and mirrors. Currently, beryllium has many industrial uses (e.g., in brake systems of airplanes, for neutron monochromatization, as window material for x-ray tubes, and in radiation detectors). The commercially important compound,

beryllium oxide, is used in the electronics industry as a substrate for transistors and silicon chips, coil cores, and laser tubes.

Limited data indicate that the oral toxicity of beryllium is low in humans. No adverse effects were noted in mice given 5 ppm beryllium in the drinking water in a lifetime bioassay. In contrast, the toxicity of inhaled beryllium is well-documented. Humans inhaling "massive" doses of beryllium compounds may develop acute berylliosis. ATSDR estimated that, based on existing data, the disease could develop at levels ranging from approximately 2-1000 $\mu\text{g Be}/\text{m}^3$. This disease usually develops shortly after exposure and is characterized by rhinitis, pharyngitis, and/or tracheobronchitis, and may progress to severe pulmonary symptoms. The severity of acute beryllium toxicity correlates with exposure levels, and the disease is now rarely observed in the United States because of improved industrial hygiene. Humans inhaling beryllium also may develop chronic berylliosis which, in contrast to acute berylliosis, is highly variable in onset, is more likely to be fatal and can develop a few months to ≥ 20 years after exposure.

Epidemiologic studies have suggested that beryllium and its compounds could be human carcinogens. Studies in workers exposed to beryllium, mostly via inhalation, have shown significant increases in observed over expected lung cancer incidences. The U.S. EPA, in evaluating the total database for the association of lung cancer with occupational exposure to beryllium, noted several limitations, but concluded that the results must be considered to be at least suggestive of a carcinogenic risk to humans. In laboratory studies, beryllium sulfate caused increased incidences of pulmonary tumors in rats and rhesus monkeys.

Based on sufficient evidence for animals and inadequate evidence for humans, beryllium has been placed in the EPA weight-of-evidence classification B2, probable human carcinogen.

A chronic RfD for the oral route of exposure from RAIS was used in the BHHRA. The values used in the BHHRA are 2.00E-03, 5.71E-06, and 1.40E-05 (mg/kg-day) for the oral, inhalation, and dermal routes, respectively. The dermal RfD was calculated assuming a GI absorption factor of 7.0. The cancer slope factor for beryllium from RAIS was used in the BHHRA. The value used was 4.30E+00, 8.40E+00, and 6.14E+02[mg/(kg \times day)]⁻¹ for the oral, inhalation, and dermal routes of exposure. The value for the oral and dermal slope factor was withdrawn by NCEA and the Federal Facility Agreement parties have agreed not to include the withdrawn slope factor for beryllium in BHHRA for PGDP.

D5.1.6 Chromium III (CAS 16065-83-1) and Chromium VI (CAS 18540-29-9) (RAIS)

Elemental chromium does not occur in nature, but it is present in ores, primarily chromite. Chromium can be found in rocks, animals, plants, soil, and in volcanic dust and gases. Chromium is present in the environment in several different forms (oxidation states). The most common forms are chromium (0), chromium (III), and chromium (VI). No taste or odor is associated with chromium compounds. Chromium (III) occurs naturally in the environment and is an essential nutrient that helps the body use sugar, protein, and fat. Chromium (VI) and chromium (0) generally are produced by industrial processes. The metal chromium, chromium (0), is used for making steel. Chromium (VI) and chromium (III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

Chromium enters the body through the lungs, digestive tract and, to a lesser extent, the skin. Inhalation is the most important route for occupational exposure. Non-occupational exposure occurs via ingestion of chromium-containing food and water. Breathing high levels of chromium (VI) can cause irritation to the nose, such as runny nose, nosebleeds, and ulcers and holes in the nasal septum. Ingesting large amounts of chromium (VI) can cause stomach upsets and ulcers, convulsions, kidney and liver damage, and even death. Skin contact with certain chromium (VI) compounds can cause skin ulcers. Some people are

extremely sensitive to chromium (VI) or chromium (III). Allergic reactions consisting of severe redness and swelling of the skin have been noted.

Several studies have shown that chromium (VI) compounds can increase the risk of lung cancer when inhaled. Animal studies also have shown an increased risk of cancer. There also is evidence for an increased risk of developing nasal, pharyngeal, and GI carcinomas. Based on sufficient evidence for humans and animals, Chromium (VI) has been placed in the EPA weight-of-evidence classification A: human carcinogen. Chromium (III) is most appropriately designated a Group D – Not classified as to its human carcinogenicity; however, the classification of chromium (VI) as a known human carcinogen raises a concern for the carcinogenic potential of trivalent chromium.

The cancer slope factor for chromium (VI) from RAIS was used in the BHHRA. The value used was $2.86E-05$ [$\text{mg}/(\text{kg} \times \text{day})$]⁻¹ for the inhalation route of exposure. Slope factors for the oral and dermal routes of exposure are not available.

Consistent with the Risk Methods Document, the chronic RfDs from RAIS associated with Chromium (III) were used in the BHHRA. The values used were $1.50E+00$ and $1.95E-02$ $\text{mg}/(\text{kg} \times \text{day})$ for the oral and dermal routes, respectively. The dermal RfD was calculated by assuming a GI absorption factor of $1.30E-02$.

D5.1.7 Cobalt

Cobalt is a naturally-occurring element that has properties similar to those of iron and nickel. It has an atomic number of 27. There is only one stable isotope of cobalt, which has an atomic mass number of 59. However, there are many unstable or radioactive isotopes, two of which are commercially important, Co-60 and Co-57. All isotopes of cobalt behave the same chemically and will therefore have the same chemical behavior in the environment and the same chemical effects on the human body.

Small amounts of cobalt occur in natural forms in most rocks, soil, water, plants, and animals, typically in small amounts. Cobalt is also found in meteorites. Elemental cobalt is a hard, silvery grey metal. However, cobalt is usually found in the environment combined with other elements such as oxygen, sulfur, and arsenic. Small amounts of these chemical compounds can be found in rocks, soil, plants, and animals. A biochemically important cobalt compound is vitamin B12 or cyanocobalamin. Vitamin B12 is essential for good health in animals and humans.

Cobalt metal usually is mixed with other metals to form alloys, which are harder or more resistant to wear and corrosion. These alloys are used in a number of military and industrial applications such as aircraft engines, magnets, and grinding and cutting tools. They are also used in artificial hip and knee joints. Cobalt compounds are used as colorants in glass, ceramics, and paints, as catalysts, and as paint driers. Cobalt colorants have a characteristic blue color; however, not all cobalt compounds are blue. Cobalt compounds are also used as trace element additives in agriculture and medicine.

Cobalt has both beneficial and harmful effects on human health. Cobalt is beneficial for humans because it is part of vitamin B12, which is essential to maintain human health. Cobalt (0.16–1.0 mg cobalt/kg of body weight) has also been used as a treatment for anemia, including in pregnant women, because it causes red blood cells to be produced. Cobalt also increases red blood cell production in healthy people, but only at very high exposure levels. Cobalt is also essential for the health of various animals, such as cattle and sheep. Exposure of humans and animals to levels of cobalt normally found in the environment is not harmful.

Too much cobalt can cause harmful health effects. Workers who breathed air containing 0.038 mg cobalt/m³ (about 100,000 times the concentration normally found in ambient air) for 6 hours had trouble breathing. Serious effects on the lungs, including asthma, pneumonia, and wheezing, have been found in people exposed to 0.005 mg cobalt/m³ while working with hard metal, a cobalt-tungsten carbide alloy. People exposed to 0.007 mg cobalt/m³ at work have also developed allergies to cobalt that resulted in asthma and skin rashes.

Nonradioactive cobalt has not been found to cause cancer in humans or in animals following exposure in the food or water. Cancer has been shown, however, in animals who breathed cobalt or when cobalt was placed directly into the muscle or under the skin. Based on the animal data, the International Agency for Research on Cancer (IARC) has determined that cobalt is possibly carcinogenic to humans.

Much of our knowledge of cobalt toxicity is based on animal studies. Cobalt is essential for the growth and development of certain animals, such as cows and sheep. Short-term exposure of rats to high levels of cobalt in the air results in death and lung damage. Longer-term exposure of rats, guinea pigs, hamsters, and pigs to lower levels of cobalt in the air results in lung damage and an increase in red blood cells. Short-term exposure of rats to high levels of cobalt in the food or drinking water results in effects on the blood, liver, kidneys, and heart. Longer-term exposure of rats, mice, and guinea pigs to lower levels of cobalt in the food or drinking water results in effects on the same tissues (heart, liver, kidneys, and blood) as well as the testes, and also causes effects on behavior. Sores were seen on the skin of guinea pigs following skin contact with cobalt for 18 days. Generally, cobalt compounds that dissolve easily in water are more harmful than those that are hard to dissolve in water.

Cancer slope factors for cobalt used in the BHHRA are 3.15E+01 [mg/(kg × day)]⁻¹ for the inhalation exposure routes, respectively. Chronic RfDs for cobalt used in the BHHRA were 3.00E-04 mg/(kg × day) for both oral and absorbed doses. The dermal RfD was calculated by assuming a GI absorption factor of 1.0.

D5.1.8 Copper (CAS 007440-50-8) (RAIS)

Copper is a reddish metal that occurs naturally in the environment in plants and animals. Copper is an essential element for all living things including humans. Copper is extensively mined in the United States and is used to make wire, sheet metal, pipes, and pennies. It also is used in farming to treat some plant diseases; in water treatment; and to preserve wood, leather, and fabrics. Also, because of its high electrical and thermal conductivity and other properties such as malleability, metallic copper is widely used in the manufacture of electrical equipment.

Copper is an essential trace element that is widely distributed in animal and plant tissues. Copper is necessary for good health and can be absorbed by the oral, inhalation, and dermal routes of exposure. Very large doses, however, can be harmful. In humans, ingestion of gram quantities of copper salts may cause GI, hepatic, and renal effects with symptoms such as severe abdominal pain, vomiting, diarrhea, hemolysis, hepatic necrosis, hematuria, proteinuria, hypotension, tachycardia, convulsions, coma, and death. Acute inhalation exposure to copper dust or fumes at concentrations of 0.075-0.12 mg Cu/m³ may cause metal fume fever with symptoms such as cough, chills and muscle ache. Skin contact with copper can result in an allergic reaction, usually skin irritation or a skin rash.

No suitable bioassays or epidemiological studies are available to assess the carcinogenicity of copper. U.S. EPA, therefore, has placed copper in weight-of-evidence group D, not classifiable as to human carcinogenicity. No slope factors, therefore, were used in this BHHRA.

The chronic RfDs for the oral and dermal routes of exposure from RAIS was used in the BHHRA. The oral and dermal RfDs used were 4.00E-02 (mg/kg-day), for both. The GI absorption factor used was 1.0.

D5.1.9 Iron (CAS 007439-89-6)

Iron is one of the most abundant metals in the environment and is used in many industrial processes. It is an essential element in the human diet. More than 80% of the iron present in the body is involved in the support of red blood cell production. In addition, it is also an essential component of myoglobin and various enzymes. Iron deficiency is the most common cause of anemia (Goodman and Gilman 1985). Exposure to excessive levels of iron may cause GI damage and dysfunction and enlargement of the liver and pancreas (Goodman and Gilman 1985).

Iron has not been classified by EPA with regard to cancer weight-of-evidence. No slope factors were used in this BHHRA.

Chronic RfDs also have not been released by EPA in IRIS or HEAST; however, oral and dermal RfDs of 7.00E-01 mg/(kg × day), for both, were used in the BHHRA based on a provisional value from NCEA. The GI absorption factor used was 1.0.

D5.1.10 Lead (CAS No. 743-99-21) (RAIS)

Lead occurs naturally as a sulfide in galena. It is a soft, bluish-white, silvery gray, malleable metal with a melting point of 327.5C. Elemental lead reacts with hot boiling acids and is attacked by pure water. The solubility of lead salts in water varies from insoluble to soluble depending on the type of salt (IARC, 1980; Goyer, 1988; Budavari et al., 1989).

Lead is a natural element that is persistent in water and soil. Most of the lead in environmental media is of anthropogenic sources. The mean concentration is 3.9 µg/L in surface water and 0.005 µg/L in sea water. River sediments contain about 20,000 µg/g and coastal sediments about 100,000 µg/g. Soil content varies with the location, ranging up to 30 µg/g in rural areas, 3000 µg/g in urban areas, and 20,000 µg/g near point sources. Human exposure occurs primarily through diet, air, drinking water, and ingestion of dirt and paint chips (EPA, 1989a; ATSDR, 1993).

The efficiency of lead absorption depends on the route of exposure, age, and nutritional status. Adult humans absorb about 10-15% of ingested lead, whereas children may absorb up to 50%, depending on whether lead is in the diet, dirt, or paint chips. More than 90% of lead particles deposited in the respiratory tract are absorbed into systemic circulation. Inorganic lead is not efficiently absorbed through the skin; consequently, this route does not contribute considerably to the total body lead burden (EPA, 1986a).

Lead absorbed into the body is distributed to three major compartments: blood, soft tissue, and bone. The largest compartment is the bone, which contains about 95% of the total body lead burden in adults and about 73% in children. The half-life of bone lead is more than 20 years. The concentration of blood lead changes rapidly with exposure, and its half-life of only 25-28 days is considerably shorter than that of bone lead. Blood lead is in equilibrium with lead in bone and soft tissue. The soft tissues that take up lead are liver, kidneys, brain, and muscle. Lead is not metabolized in the body, but it may be conjugated with glutathione and excreted primarily in the urine (EPA, 1986a,c; ATSDR, 1993). Exposure to lead is evidenced by elevated blood lead levels.

The systemic toxic effects of lead in humans have been well-documented by the EPA (EPA, 1986a-e, 1989a, 1990) and ATSDR (1993), who reviewed and evaluated extensively data reported in the literature

up to 1991. The evidence shows that lead is a multitargeted toxicant, causing effects in the gastrointestinal tract, hematopoietic system, cardiovascular system, central and peripheral nervous systems, kidneys, immune system, and reproductive system. Overt symptoms of subencephalopathic central nervous system (CNS) effects and peripheral nerve damage occur at blood lead levels of 40-60 µg/dL, and nonovert symptoms, such as peripheral nerve dysfunction, occur at levels of 30-50 µg/dL in adults; no clear threshold is evident. Cognitive and neuropsychological deficits are not usually the focus of studies in adults, but there is some evidence of neuropsychological impairment (Ehle and McKee, 1990) and cognitive deficits in lead workers with blood levels of 41-80 µg/dL (Stollery et al., 1991).

Although similar effects occur in adults and children, children are more sensitive to lead exposure than are adults. Irreversible brain damage occurs at blood lead levels greater than or equal to 100 µg/dL in adults and at 80-100 µg/dL in children; death can occur at the same blood levels in children. Children who survive these high levels of exposure suffer permanent severe mental retardation.

As discussed previously, neuropsychological impairment and cognitive (IQ) deficits are sensitive indicators of lead exposure; both neuropsychological impairment and IQ deficits have been the subject of cross-sectional and longitudinal studies in children. One of the early studies reported IQ score deficits of four points at blood lead levels of 30-50 µg/dL and one to two points at levels of 15-30 µg/dL among 75 black children of low socioeconomic status (Schroeder and Hawk, 1986).

Very detailed longitudinal studies have been conducted on children (starting at the time of birth) living in Port Pirie, Australia (Vimpani et al., 1985, 1989; McMichael et al., 1988; Wigg et al., 1988; Baghurst et al., 1992a,b), Cincinnati, Ohio (Dietrich et al., 1986, 1991, 1992, 1993), and Boston, Massachusetts (Bellinger et al., 1984, 1987a,b, 1990, 1992; Stiles and Bellinger 1993). Various measures of cognitive performance have been assessed in these children. Studies of the Port Pirie children up to 7 years of age revealed IQ deficits in 2-year-old children of 1.6 points for each 10-µg/dL increase in blood lead, deficits of 7.2 points in 4-year-old children, and deficits of 4.4 to 5.3 points in 7-year-old children as blood lead increased from 10-30 µg/dL. No significant neurobehavioral deficits were noted for children, 5 years or younger, who lived in the Cincinnati, Ohio, area. In 6.5-year-old children, performance IQ was reduced by 7 points in children whose lifetime blood level exceeded 20 µg/dL.

Children living in the Boston, Massachusetts, area have been studied up to the age of 10 years. Cognitive performance scores were negatively correlated with blood lead in the younger children in the high lead group (greater than or equal to 10 µg/dL), and improvements were noted in some children at 57 months as their blood lead levels became lower. However, measures of IQ and academic performance in 10-year-old children showed a 5.8-point deficit in IQ and an 8.9-point deficit in academic performance as blood lead increased by 10 µg/dL within the range of 1-25 µg/dL. Because of the large database on subclinical neurotoxic effects of lead in children, only a few of the studies have been included. However, EPA (EPA, 1986a, 1990) concluded that there is no clear threshold for neurotoxic effects of lead in children.

In adults, the cardiovascular system is a very sensitive target for lead. Hypertension (elevated blood pressure) is linked to lead exposure in occupationally exposed subjects and in the general population. Three large population-based studies have been conducted to study the relationship between blood lead levels and high blood pressure. The British Regional Heart Study (BRHS) (Popcock et al., 1984), the NHANES II study (Harlan et al., 1985; Pirkle et al., 1985; Landis and Flegal, 1988; Schwartz, 1991; EPA, 1990), and Welsh Heart Programme (Ellwood et al., 1988a,b) comprise the major studies for the general population. The BRHS study showed that systolic pressure greater than 160 mm Hg and diastolic pressure greater than 100 mm Hg were associated with blood lead levels greater than 37 µg/dL (Popcock et al., 1984). An analysis of 9933 subjects in the NHANES study showed positive correlations between blood pressure and blood lead among 12-74-year-old males but not females (Harlan et al., 1985; Landis and Flegal et al., 1988), 40-59-year-old white males with blood levels ranging from 7-34 µg/dL (Pirkle et

al., 1985), and males and females greater than 20 years old (Schwartz, 1991). In addition, left ventricular hypertrophy was also positively associated with blood lead (Schwartz, 1991). The Welsh study did not show an association among men and women with blood lead of 12.4 and 9.6 µg/dL, respectively (Ellwood et al., 1988a,b). Other smaller studies showed both positive and negative results. The EPA (EPA, 1990) concluded that increased blood pressure is positively correlated with blood lead levels in middle-aged men, possibly at concentrations as low as 7 µg/dL. In addition, the EPA estimated that systolic pressure is increased by 1.5-3.0 mm Hg in males and 1.0-2.0 mm Hg in females for every doubling of blood lead concentration.

The hematopoietic system is a target for lead as evidenced by frank anemia occurring at blood lead levels of 80 µg/dL in adults and 70 µg/dL in children. The anemia is due primarily to reduced heme synthesis, which is observed in adults having blood levels of 50 µg/dL and in children having blood levels of 40 µg/dL. Reduced heme synthesis is caused by inhibition of key enzymes involved in the synthesis of heme. Inhibition of erythrocyte-aminolevulinic acid dehydrase (ALAD) activity (catalyzes formation of porphobilinogen from -aminolevulinic acid) has been detected in adults and children having blood levels of less than 10 µg/dL. ALAD activity is the most sensitive measure of lead exposure, but erythrocyte zinc protoporphyrin is the most reliable indicator of lead exposure because it is a measure of the toxicologically active fraction of bone lead. The activity of another erythrocyte enzyme, pyrimidine-5-nucleotidase, is also inhibited by lead exposure. Inhibition has been observed at levels below 5 µg/dL; no clear threshold is evident.

Other organs or systems affected by exposure to lead are the kidneys, immune system, reproductive system, gastrointestinal tract, and liver. These effects usually occur at high blood levels, or the blood levels at which they occur have not been sufficiently documented.

The EPA has not developed an RfD for lead because it appears that lead is a nonthreshold toxicant, and it is not appropriate to develop RfDs for these types of toxicants. Instead the EPA has developed the Integrated Exposure Uptake Biokinetic Model to estimate the percentage of the population of children up to 6 years of age with blood lead levels above a critical value, 10 µg/dL. The model determines the contribution of lead intake from multimedia sources (diet, soil and dirt, air, and drinking water) on the concentration of lead in the blood. Site-specific concentrations of lead in various media are used when available; otherwise default values are assumed. The EPA has established a screening level of 400 mg/kg for lead in residential soil and 800 mg/kg in industrial soil (EPA, 2010).

Inorganic lead and lead compounds have been evaluated for carcinogenicity by the EPA (EPA, 1989a, 1994a). The data from human studies are inadequate for evaluating the potential carcinogenicity of lead. Data from animal studies, however, are sufficient based on numerous studies showing that lead induces renal tumors in experimental animals. A few studies have shown evidence for induction of tumors at other sites (cerebral gliomas; testicular, adrenal, prostate, pituitary, and thyroid tumors). An oral slope factor of 8.50E-03 has been developed by the California EPA. No other slope factors are available.

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D5.1.11 Manganese (CAS 007439-96-5) (RAIS)

Manganese is a silver-colored, naturally occurring metal that is found in many types of rocks and makes up about 0.10% of the earth's crust. Manganese is not found alone, but combines with other substances such as oxygen, sulfur, or chlorine. Manganese also can be combined with carbon to make organic manganese compounds, including pesticides (e.g., maneb or mancozeb) and methylcyclopentadienyl manganese tricarbonyl, a fuel additive in some gasolines. Manganese is an essential trace element and is necessary for good health. Normal nutritional requirements of manganese are satisfied through the diet, which is the normal source of the element, with minor contributions from water and air. The National Research Council recommends a dietary allowance of 2-5 mg/day for a safe and adequate intake of manganese for an adult human. Manganese can be found in several food items, including grains, cereals, and tea.

Manganese can elicit a variety of serious toxic responses upon prolonged exposure to elevated concentrations, either orally or by inhalation. The central nervous system is the primary target. Initial symptoms are headache, insomnia, disorientation, anxiety, lethargy, and memory loss. These symptoms

progress with continued exposure and eventually include motor disturbances, tremors, and difficulty in walking, symptoms similar to those seen with Parkinsonism. These motor difficulties are often irreversible. Some individuals exposed to very high levels of manganese for long periods of time at work developed mental and emotional disturbances and slow and clumsy body movements. This combination of symptoms is a disease called "manganism."

There are no human cancer data available for manganese. Manganese has been placed in the EPA weight-of-evidence classification D: not classifiable as to human carcinogenicity. No slope factors, therefore, were used in this BHHRA.

The oral, inhalation, and dermal RfDs for manganese in diet from RAIS used in the BHHRA were 1.40E-01 and 1.43E-05, and 1.40E-01 mg/(kg × day), respectively. The GI absorption factor is 1.0.

D5.1.12 Mercury (CAS 007439-97-6) (RAIS)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid; if heated, it is a colorless, odorless gas. Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds; methylmercury is the most common organic mercury compound and is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make. Metallic mercury is used to produce chlorine gas and caustic soda and is also used in thermometers, dental fillings, electrical switches, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury reaches the brain in these forms. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems. Short-term exposure to high levels of metallic mercury vapors may cause lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

No data were available regarding the carcinogenicity of mercury in humans or animals. EPA has placed inorganic mercury in weight-of-evidence classification D, not classifiable as to human carcinogenicity. Other forms of mercury are possible human carcinogens.

A chronic RfD for the oral route of exposure from RAIS was used in the BHHRA. The values used in the BHHRA are 3.00E-04 and 2.10E-05 (mg/kg-day) for the oral and dermal routes, respectively. The dermal RfD was calculated assuming a GI absorption factor of 7.0E-02.

D5.1.13 Molybdenum CAS No. 7439-98-7) (RAIS)

Molybdenum (Mo) occurs naturally in various ores; the principal source being molybdenite (MoS₂) (Stokinger, 1981). Molybdenum compounds are used primarily in the production of metal alloys. Molybdenum is considered an essential trace element; the provisional recommended dietary intake is 75-250 g/day for adults and older children (NRC, 1989).

Water-soluble molybdenum compounds are readily taken up through the lungs and gastrointestinal tract; but insoluble compounds are not. Following absorption, molybdenum is distributed throughout the body with the highest levels generally found in the liver, kidneys, spleen, and bone (Wennig and Kirsch, 1988).

Limited data suggest that 25 to 50% of an oral dose is excreted in the urine, with small amounts also eliminated in the bile. Biological half-life may vary from several hours in laboratory animals to as much as several weeks in humans (Friberg and Lener, 1986; Jarrell et al., 1980; Stokinger, 1981; Vanoeteren et al., 1982; Venugopal and Luckey, 1978).

Data documenting molybdenum toxicity in humans are limited. The physical and chemical state of the molybdenum, route of exposure, and compounding factors such as dietary copper and sulfur levels may all affect toxicity. Mild cases of molybdenosis may be clinically identifiable only by biochemical changes (e.g., increases in uric acid levels due to the role of molybdenum in the enzyme xanthine oxidase). Excessive intake of molybdenum causes a physiological copper deficiency, and conversely, in cases of inadequate dietary intake of copper, molybdenum toxicity may occur at lower exposure levels.

There is no information available on the acute or subchronic oral toxicity of molybdenum in humans. In studies conducted in a region of Armenia where levels of molybdenum in the soil are high (77 mg Mo/kg), 18% of the adults examined in one town and 31% of those in another town were found to have elevated concentrations of uric acid in the blood and urine, increased blood xanthine oxidase activity, and gout-like symptoms such as arthralgia, articular deformities, erythema, and edema (Kovalskii et al., 1961). The daily molybdenum intake was estimated to be 10-15 mg. An outbreak of genu valgum (knock-knees) in India was attributed to an increase in Mo levels in sorgum, the main staple food of the region. The estimated daily Mo intake was 1.5 mg (Jarrell et al., 1980).

In animals, acutely toxic oral doses of molybdenum result in severe gastrointestinal irritation with diarrhea, coma and death from cardiac failure. Oral LD₅₀ values of 125 and 370 mg Mo/kg for molybdenum trioxide and ammonium molybdate, respectively, have been reported in laboratory rats (Venugopal and Luckey, 1978). Subchronic and chronic oral exposures can result in gastrointestinal disturbances, growth retardation, anemia, hypothyroidism, bone and joint deformities, sterility, liver and kidney abnormalities, and death (Lloyd et al., 1976; Venugopal and Luckey, 1978; Valli et al., 1969; Fairhall et al., 1945; Rana and Kumar, 1980). Fatty degeneration of the liver occurred in rabbits dosed with 50 mg/kg/day for 6 mo (Asmangulyan, 1965) and in rats dosed with 5 mg/kg/day as ammonium molybdate for 1 year (Valjcek and Sramko, 1973). Male sterility, was reported in rats fed diets containing 80 or 140 ppm Mo (Jeter and Davis, 1954). Teratogenic effects have not been observed in mammals, but embryotoxic effects, including reduced weight gain, reduced skeletal ossification, nerve system demyelination, and reduced survival of offspring have been reported (Wide, 1984; Earl and Vish, 1979; Schroeder and Mitchener, 1971).

Information on the inhalation toxicity of molybdenum in humans following acute and subchronic exposures is not available. Studies of workers chronically exposed to Mo indicate a high incidence of weakness, fatigue, headache, irritability, lack of appetite, epigastric pain, joint and muscle pain, weight loss, red and moist skin, tremor of the hands, sweating, and dizziness (Akopajan, 1964; Ecolajan, 1965; Walravens et al., 1979). Elevated levels of Mo in blood plasma and urine and high levels of ceruloplasmin and uric acid in blood serum were reported for workers exposed to Mo (8-hr TWA 9.5 mg Mo/m³) (Walravens et al., 1979). Occupational exposure to molybdenum may also result in increased serum bilirubin levels and decreased blood IgA/IgG ratios due to a rise in alpha-immunoglobulins (Avakajan, 1966b; 1968). Direct pulmonary effects of chronic exposure to Mo have been reported in only one study in which 3 of 19 workers exposed to Mo and MoO₃ (1 to 19 mg/m³) for 3-7 years were symptomatic and had X-ray findings indicative of pneumoconiosis (Mogilevskaya, 1963). Adverse reproductive or developmental effects have not been observed in molybdenum workers (Metreveli et al., 1985).

In animal studies, inhalation exposures to molybdenum compounds have resulted in respiratory tract irritation, pulmonary hemorrhages, perivascular edema, and liver and kidney damage (Mogilevskaya, 1963; Fairhall, et al., 1945). Other effects reported in animals include diarrhea, muscle incoordination,

loss of hair, loss of weight (Fairhall et al., 1945), changes in ECG, increased arterial blood pressure, increased serum lactate dehydrogenase, increased cardiac adrenaline and noradrenaline levels (Babayán et al., 1984), and inflammation of the uterine horns with necrotic foci and endometrial atrophy (Metreveli and Daneliya, 1984). Some molybdenum compounds, such as molybdenum trioxide and sodium molybdate (Na_2MoO_4) are strong eye and skin irritants; however, others, such as calcium and zinc molybdates are not primary irritants.

Subchronic and chronic Reference Concentrations (RfC) for molybdenum are not available.

Information on the oral or inhalation carcinogenicity of molybdenum compounds in humans was not available, and animal data indicate that Mo may have an inhibitory effect on esophageal (Luo et al., 1983; van Rensburg et al., 1986; Komada, et al., 1990) and mammary carcinogenesis (Wei et al., 1987). However, intraperitoneal injections of MoO_3 in mice produced a significant increase in the number of lung adenomas per mouse and an insignificant increase in the number of mice bearing tumors (Stoner et al., 1976). Molybdenum is placed in EPA Group D, not classifiable as to carcinogenicity in humans (U.S. EPA, 1990) and calculation of slope factors is not possible.

The chronic oral Reference Dose (RfD) for molybdenum and molybdenum compounds is 0.005 mg/kg/day, based on biochemical indices in humans (U.S. EPA, 1992). The subchronic RfD is also 0.005 mg/kg/day (U.S. EPA, 1992).

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D5.1.14 Nickel (CAS 007440-02-0 for soluble nickel salts) (RAIS)

Nickel is a very abundant element in the environment. It is found primarily combined with oxygen (oxides) or sulfur (sulfides), found in all soils, and is emitted from volcanoes. Pure nickel is a hard,

silvery-white metal that is combined with other metals to form alloys. Some of the metals that nickel can be alloyed with are iron, copper, chromium, and zinc. These alloys are used to make metal coins and jewelry and in industry. Nickel compounds also are used for nickel plating, to color ceramics, to make some batteries, and as substances known as catalysts that increase the rate of chemical reactions. Nickel and its compounds have no characteristic odor or taste. Nickel forms included in this profile are nickel carbonyl, CAS number 13463-39-3; nickel refinery dust, no CAS number; nickel subsulfide, CAS number 12035-72-2; and nickel soluble salts, no CAS number.

Nickel is required to maintain health in animals. A small amount of nickel probably is essential for humans, although a lack of nickel has not been found to affect the health of humans. The absorption of nickel is dependent on its physicochemical form, with water-soluble forms being more readily absorbed. The most common adverse health effect of nickel in humans is an allergic reaction. Humans can become sensitive to nickel when jewelry or other nickel-containing items are in direct contact with the skin. Once a person is sensitized to nickel, further contact will produce a reaction; the most common reaction is a skin rash at the site of contact. Less frequently, some humans who are sensitive to nickel have asthma attacks or other reactions following exposure to nickel in food, water, or dust. Lung effects, including chronic bronchitis and reduced lung function, have been observed in workers who breathed large amounts of nickel. Current levels of nickel in workplace air are much lower than in the past, and today few workers show symptoms of nickel exposure. Humans who are not sensitive to it must eat very large amounts of nickel to show adverse health effects. In large doses (>0.5 g), some forms of nickel may be acutely toxic to humans when taken orally. Workers who accidentally drank water containing very high levels of nickel (100,000 times more than in normal drinking water) had stomachaches and effects on their blood and kidneys.

Epidemiologic studies have shown that occupational inhalation exposure to nickel dust (primarily nickel subsulfide) at refineries has resulted in increased incidences of pulmonary and nasal cancer. Inhalation studies using rats also have shown nickel subsulfide or nickel carbonyl to be carcinogenic. Based on these data, the EPA has classified nickel subsulfide and nickel refinery dust in weight-of-evidence group A; human carcinogen. Based on an increased incidence of pulmonary carcinomas and malignant tumors in animals exposed to nickel carbonyl by inhalation or by intravenous injection, this compound had been placed in weight-of-evidence group B2: probable human carcinogen. The U.S. EPA has not evaluated soluble salts of nickel as a class of compounds for potential human carcinogenicity. Because the form of nickel of concern to this BHHRA was soluble salts, no slope factors were used in this BHHRA.

A chronic RfD for the oral and dermal routes of exposure from RAIS was used in the BHHRA. The RfDs used in the BHHRA for the oral and dermal routes of exposure were 2.00E-02 and 8.00E-04 mg/(kg × day), respectively. The dermal route RfD was based on a GI absorption factor of 4.00E-02.

D5.1.15 Selenium (CAS 007782-49-2) (RAIS)

Selenium is a metal commonly found in rocks and soil; much of the selenium in rocks is combined with sulfide minerals or with silver, copper, lead, and nickel minerals. Selenium and oxygen combine to form several compounds. Selenium sulfide is a bright red-yellow powder used in anti-dandruff shampoo. Industrially produced hydrogen selenide is a colorless gas with a disagreeable odor. It is probably the only selenium compound that might pose a health concern in the workplace. Selenium dioxide is an industrially produced compound that dissolves in water to form selenious acid. Selenious acid can be found in gun bluing (a solution used to clean the metal parts of a gun). Selenium is an essential trace element important in many biochemical processes that take place in human cells. Recommended human dietary allowances for selenium for adults is about 40-70 µg.

In humans, acute oral exposures can result in excessive salivation, garlic odor to the breath, shallow breathing, diarrhea, pulmonary edema, and death. Other reported signs and symptoms of acute selenosis include tachycardia, nausea, vomiting, abdominal pain, abnormal liver function, muscle aches and pains, irritability, chills, and tremors. The exact levels at which these effects occur are not known. GI absorption in animals and humans of various selenium compounds ranges from about 44% to 95% of the ingested dose. If too much selenium is ingested over long periods of time, brittle hair and deformed nails can develop. Upon contact with skin, selenium compounds have caused rashes, swelling, and pain. Respiratory tract absorption rates of 97% and 94% for aerosols of selenious acid have been reported for dogs and rats, respectively. In humans, inhalation of selenium or selenium compounds primarily affects the respiratory system. Dusts of elemental selenium and selenium dioxide can cause irritation of the skin and mucous membranes of the nose and throat, coughing, nosebleed, loss of sense of smell, dyspnea, bronchial spasms, bronchitis, and chemical pneumonia.

Studies of laboratory animals and humans show that most selenium compounds probably do not cause cancer. In fact, human studies suggest that lower-than-normal selenium levels in the diet might increase the risk of cancer. Other forms of selenium may, however, be carcinogenic according to the DHHS. Selenium sulfide produced a significant increase in the incidence of lung and liver tumors in rats and mice. EPA has placed selenium and selenious acid in Group D, not classifiable as to carcinogenicity in humans, while selenium sulfide is placed in Group B2, probable human carcinogen. Selenium sulfide is very different from the selenium compounds found in foods and in the environment. Selenium sulfide has not caused cancer in animals when it is placed on the skin, and the use of anti-dandruff shampoos containing selenium sulfide is considered safe.

Chronic RfDs from RAIS were available for selenium. The RfDs used in the BHHRA for the oral and dermal routes of exposure were 5.00E-03 mg/(kg × day), for both. The dermal route RfD was based on a GI absorption factor of 1.00E+00.

D5.1.16 Silver (CAS 97161-97-2) (RAIS)

Silver is a relatively rare metal that occurs naturally in the earth's crust and is released to the environment from various industrial sources. Human exposure to silver and silver compounds can occur orally, dermally, or by inhalation. Silver is found in most tissues, but has no known physiologic function.

In humans, accidental or intentional ingestion of large doses of silver nitrate has produced corrosive damage of the gastrointestinal tract, abdominal pain, diarrhea, vomiting, shock, convulsions, and death (U.S. EPA, 1985). Respiratory irritation was noted following acute inhalation exposure to silver or silver compounds. Silver nitrate solutions are highly irritating to the skin, mucous membranes, and eyes (Stokinger, 1981).

Ingestion, inhalation, or dermal absorption of silver may cause argyria, the most common indicator of long-term exposure to silver or silver compounds in humans. Argyria is a gray or blue-gray, permanent discoloration of the skin and mucous membranes that is not a toxic effect per se, but is considered cosmetically disfiguring. Chronic inhalation exposure of workers to silver oxide and silver nitrate dusts resulted in upper and lower respiratory irritation, deposition of granular silver-containing deposits in the eyes, impaired night vision, and abdominal pain (Rosenman et al., 1979). Mild allergic responses have been attributed to dermal contact with silver (ATSDR, 1990).

In long-term oral studies with experimental animals, silver compounds have produced slight thickening of the basement membranes of the renal glomeruli, growth depression, shortened lifespan, and granular silver-containing deposits in skin, eyes, and internal organs (Matuk et al., 1981; Olcott, 1948, 1950).

Hypoactivity was seen in rats subchronically exposed to silver nitrate in drinking water (Rungby and Danscher, 1984).

A Reference Dose (RfD) of 0.005 mg/kg/day for oral exposure was used in this BHHRA. The absorbed RfD used was 2.00E-04. The lowest-observed-adverse-effect level (LOAEL) of 0.014 mg/kg/day for argyria observed in patients receiving i.v. injections of silver arsphenamine was calculated by USEPA (U.S. EPA, 1992a,b). Data are presently insufficient to derive a Reference Concentration (RfC) for silver (U.S. EPA, 1992a). The gastrointestinal absorption factor used was 4.00E-02.

Data adequate for evaluating the carcinogenicity of silver to humans or animals by ingestion, inhalation, or other routes of exposure were not found. Based on U.S. EPA guidelines, silver is placed in weight-of-evidence group D, not classifiable as to human carcinogenicity (U.S. EPA, 1992a).

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D5.1.17 Thallium (CAS 007440-28-0) (RAIS)

Pure thallium is a bluish-white metal that is found in trace amounts in the earth's crust. In the past, thallium was obtained as a by-product from smelting other metals; however, it has not been produced in

the United States since 1984. Currently, all the thallium is obtained from imports and from thallium reserves. In its pure form, thallium is odorless and tasteless. It can also be found combined with other substances such as bromine, chlorine, fluorine, and iodine. When it's combined, it appears colorless-to-white or yellow. The EPA has evaluated the toxicity of the following thallium compounds: thallic oxide, CAS number 1314-32-5; thallium acetate, CAS number 563-68-8; thallium carbonate, CAS number 6533-73-9; thallium chloride, CAS number 7791-12-0; thallium nitrate, CAS number 10102-45-1; thallium selenite, CAS number 12039-52-0; and thallium sulfate CAS number 7446-18-6. Thallium is used mostly in manufacturing electronic devices, switches, and closures, primarily for the semiconductor industry. It also has limited use in the manufacture of special glass and for certain medical procedures.

Exposure to high levels of thallium can result in harmful health effects. A study on workers exposed on the job over several years reported nervous system effects, such as numbness of fingers and toes, from breathing thallium. Humans who ingested large amounts of thallium over a short time have reported vomiting, diarrhea, temporary hair loss, and effects on the nervous system, lungs, heart, liver, and kidneys as well as death. It is not known what the effects are from ingesting low levels of thallium over a long time. Birth defects were not reported in the children of mothers exposed to low levels from eating vegetables and fruits contaminated with thallium. Studies in rats, however, exposed to high levels of thallium, showed adverse developmental effects.

Data suitable for evaluating the carcinogenicity of thallium to humans or animals by ingestion, inhalation, or other routes of exposure were not found. Thallium sulfate, selenite, nitrate, chloride, carbonate, acetate, and thallic oxide have been placed in EPA's weight-of-evidence Group D, not classifiable as to human carcinogenicity based on inadequate human and animal data. The DHHS and the IARC, have not classified pure thallium as to its human carcinogenicity. No studies are available in humans or animals on the carcinogenic effects of breathing, ingesting, or touching thallium.

Chronic RfDs from RAIS were available for thallium chloride. The RfDs used in the BHHRA for the oral and dermal routes of exposure is 8.00E-05 (mg/kg-day), for both. The dermal route RfD was based on a GI absorption factor of 1.00E+00.

D5.1.18 Uranium (metal and soluble salts) (CAS 007440-61-1)

Uranium is a hard, silvery white amphoteric metal and is a radioactive element. In its natural state it consists of three isotopes: ^{234}U , ^{235}U , and ^{238}U . More than 100 uranium minerals exist; those of commercial importance are the oxides and oxygenous salts. The processing of uranium ore generally involves extraction then leaching either by an acid or a carbonate method. In addition, the metal may be obtained from its halides by fused salt electrolysis. The primary use of natural uranium is in nuclear energy as a fuel for nuclear reactors, in plutonium production, and as feeds for gaseous diffusion plants; it is also a source of radium salts. Uranium compounds are used in staining glass, glazing ceramics, and enameling; in photographic processes; for alloying steels; and as a catalyst for chemical reactions, radiation shielding, and aircraft counterweights (Sittig 1985).

The primary route of exposure to uranium metals and salts is through dermal contact. Uranium soluble compounds act as a poison to cause kidney damage under acute exposure and pneumoconiosis or pronounced blood changes under chronic exposure conditions. Furthermore, it is difficult to separate the toxic chemical effects of uranium and its compounds from their radiation effects. The chronic radiation effects are similar to those produced by ionizing radiation. Reports now confirm that carcinogenicity is related to dose and exposure time. Cancer of the lung, osteosarcoma, and lymphoma have all been reported (Sittig 1985). An EPA weight-of-evidence classification for uranium metal was not located in the available literature. Slope factors for uranium metal also were not available for use in the BHHRA.

Chronic RfDs from RAIS were available for uranium metal (listed as uranium soluble salts). The oral and dermal RfD used in the BHHRA was 3.00E-03 mg/(kg × day), for both. A GI absorption factor of 1.00E+00 was used to derive the dermal RfD.

D5.1.19 Vanadium (CAS 007440-62-2 for metal) (RAIS)

Vanadium is a compound that occurs in nature as a white-to-gray metal and is often found as crystals. Pure vanadium has no smell and usually combines with other elements such as oxygen, sodium, sulfur, or chloride, which greatly alter toxicity. Vanadium and vanadium compounds can be found in the earth's crust and in rocks, some iron ores, and crude petroleum deposits. Vanadium is mostly combined with other metals to make special metal mixtures called alloys. Most of the vanadium used in the United States, vanadium oxide, is used to make steel for automobile parts, springs, and ball bearings. Vanadium oxide is a yellow-orange powder, dark-gray flakes, or yellow crystals. Vanadium also is mixed with iron to make important parts for aircraft engines. Small amounts of vanadium are used in making rubber, plastics, ceramics, and other chemicals.

Exposure to high levels of vanadium can cause harmful health effects. Vanadium compounds are poorly absorbed through the digestive system (0.5-2% of dietary amount), but slightly more readily absorbed through the lungs (20-25%). The major effects from breathing high levels of vanadium are on the lungs, throat, and eyes. Workers who breathed it for short and long periods sometimes had lung irritation, coughing, wheezing, chest pain, runny nose, and a sore throat. These effects stopped soon when removed from the contaminated air. Similar effects have been observed in animal studies. No other significant health effects of vanadium have been found in humans. The health effects in humans of ingesting vanadium are not known. Animals that ingested very large doses have died. Lower, but still high, levels of vanadium in the water of pregnant animals resulted in minor birth defects. Some animals that breathed or ingested vanadium over a long term had minor kidney and liver changes.

There is no evidence that any vanadium compound is carcinogenic; however, very few adequate studies are available for evaluation. No increase in tumors was noted in a long-term animal study where the animals were exposed to vanadium in the drinking water. The DHHS, the IARC, and EPA have not classified vanadium as to its human carcinogenicity.

Chronic RfDs from RAIS were available for vanadium. The RfDs used in the BHHRA for the oral and dermal routes of exposure were 7.00E-05 and 1.820E-06 mg/(kg × day), respectively. The dermal route RfD was based on a GI absorption factor of 2.60E-02.

D5.1.20 Zinc (CAS 007440-66-6 for metal) (RAIS)

Pure zinc is a bluish-white, shiny metal. Zinc is one of the most common elements in the earth's crust and is found in air, soil, and water, and is present in all foods. Zinc has many commercial uses as coatings to prevent rust, in dry -cell batteries, and mixed with other metals to make alloys like brass and bronze. A zinc and copper alloy is used to make pennies in the United States. Zinc combines with other elements to form zinc compounds; common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, zinc phosphide, zinc cyanide, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dye, wood preservatives, and ointments.

Zinc is an essential element, with recommended daily allowances ranging from 5 mg for infants to 15 mg for adult males. Too little zinc can cause health problems, but too much zinc also is harmful.

The digestive tract absorbs 20% to 80 % of ingested zinc based on the chemical compound ingested. Harmful health effects generally begin at levels in the 100 to 250 mg/day range. Eating large amounts of

zinc, even for a short time, can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia, pancreas damage, and lower levels of high-density lipoprotein cholesterol (the good form of cholesterol). Breathing large amounts of zinc (as dust or fumes) can cause a specific short-term disease called metal fume fever. This is believed to be an immune response affecting the lungs and body temperature. The long-term effects of breathing high levels of zinc or the effects on human reproduction are not known. Rats that were fed large amounts of zinc became infertile or had smaller babies. Irritation also was observed on the skin of rabbits, guinea pigs, and mice when exposed to some zinc compounds. Skin irritation will probably occur in humans.

No case studies or epidemiologic evidence has been presented to suggest that zinc is carcinogenic in humans by the oral or inhalation route. In animal studies, zinc sulfate in drinking water or zinc oleate in the diet of mice for a period of one year did not result in a statistically significant increase in tumors; however, in a 3-year, 5-generation study on tumor-resistant and tumor-susceptible strains of mice, exposure to zinc in drinking water resulted in increased frequencies of tumors. EPA has placed zinc in weight-of-evidence Group D: not classifiable as to human carcinogenicity due to inadequate evidence in humans and animals. There were no slope factors available for zinc in this BHHRA.

Chronic RfDs from RAIS were available for zinc. The RfD used in the BHHRA for the oral and dermal routes of exposure was $3.00E-01$ mg/(kg × day), for both. The dermal route RfD was based on a GI absorption factor of $1.00E+00$.

D5.2 ORGANIC COMPOUNDS

D5.2.1 Total PCBs (high risk) (RAIS)

PCBs are inert, thermally and physically stable, and have dielectric properties. In the environment, the behavior of PCB mixtures is directly correlated to the degree of chlorination. They have been used in closed systems such as heat transfer liquids, hydraulic fluids and lubricants, and in open systems such as plasticizers, surface coatings, inks, adhesives, pesticide extenders, and for microencapsulation of dyes for carbonless duplicating papers. Aroclor is strongly sorbed to soil and remains immobile when leached with water; however, the mixture is highly mobile in the presence of organic solvents. PCBs are resistant to chemical degradation by oxidation or hydrolysis. PCBs have high bioconcentration factors and tend to accumulate in the fat of fish, birds, mammals, and humans.

PCBs are absorbed after oral, inhalation, or dermal exposure and are stored in adipose tissue. The major route of PCB excretion is in the urine and feces; however, more important is the elimination in human milk. Accidental human poisonings and data from occupational exposure to PCBs suggest initial dermal and mucosal disturbances followed by systemic effects that may manifest themselves several years post-exposure. Initial effects are enlargement and hypersecretion of the Meibomian gland of the eye, swelling of the eyelids, pigmentation of the fingernails and mucous membranes, fatigue, and nausea. These effects were followed by hyperkeratosis, darkening of the skin, acneform eruptions, edema of the arms and legs, neurological symptoms, such as headache and limb numbness, and liver disturbance.

Data are suggestive but not conclusive concerning the carcinogenicity of PCBs in humans; however, hepatocellular carcinomas in three strains of rats and two strains of mice have led the EPA to classify PCBs as group B2, probable human carcinogen.

Cancer slope factors for the total class of PCBs (based on high risk) are available from RAIS. The slope factors used in the BHHRA for the oral, inhalation, and dermal exposure routes are $2.00E+00$, $2.20E+00$, and $2.00E+00$ [mg/(kg × day)]⁻¹, respectively. The slope factor for the dermal exposure route was calculated by assuming a GI absorption factor of 90%.

Chronic RfDs for PCB-1254 are available from RAIS. This RfD was used for calculating noncarcinogenic hazard for Total PCBs. The value used in the BHHRA for the oral, and dermal routes was 2.00E-05 mg/(kg × day) for both. The dermal RfD was derived using a GI absorption factor of 90%.

D5.2.2 Total PAHs

Total PAHs are evaluated in this BRA by weighting the concentration of each PAH to convert it to benzo(a) pyrene equivalents as described in the 2001 Risk Methods Document and then evaluating the sum of the concentrations based on the toxicity of benzo(a)pyrene. The PAHs included in this calculation for the PAH class are benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene.

Benzo[a]pyrene is one of many chemicals known as PAHs. It exists as yellowish plates and needles. Benzo[a]pyrene is practically insoluble in water but is soluble in benzene, toluene, xylene and sparingly soluble in alcohol and methanol. No current commercial production or use of benzo[a]pyrene is known. It occurs ubiquitously in products of incomplete combustion and in fossil fuels. It has been identified in surface water, tap water, rain water, groundwater, waste water, and sewage sludge. Benzo[a]pyrene is primarily released to the air and removed from the atmosphere by photochemical oxidation and dry deposition to land or water. Biodegradation is the most important transformation process in soil or sediment.

No data are available on the systemic (noncarcinogenic) effects of benzo[a]pyrene in humans. Benzo[a]pyrene is readily absorbed following inhalation, oral, and dermal routes of administration. Following inhalation exposure, benzo[a]pyrene is rapidly distributed to several tissues in rats. The metabolism of benzo[a]pyrene is complex and includes the formation of a proposed ultimate carcinogen, benzo[a]pyrene 7,8 diol-9,10-epoxide. Dietary administration of doses as low as 10 mg/kg during gestation caused reduced fertility and reproductive capacity in mice offspring, and treatment by gavage with 120 mg/kg/day during gestation caused stillbirths, resorptions, and malformations.

Numerous epidemiologic studies have shown a clear association between exposure to various mixtures of PAHs containing benzo[a]pyrene (e.g., coke oven emissions, roofing tar emissions, and cigarette smoke) and increased risk of lung cancer and other tumors. Each of the mixtures also contained other potentially carcinogenic PAHs; therefore, it is not possible to evaluate the contribution of benzo[a]pyrene to the carcinogenicity of these mixtures. Based on United States EPA guidelines, benzo[a]pyrene was assigned to weight-of-evidence group B2, probable human carcinogen.

Cancer slope factors for benzo[a]pyrene are available from RAIS, and are described in the section on that chemical, as are other constants used for specific PAHs.

D5.2.3 Naphthalene (CAS 000091-20-3)

Naphthalene is a white solid that is found naturally in fossil fuels and that exhibits a typical mothball odor. Naphthalene is a polycyclic aromatic hydrocarbon composed of two fused benzene rings. Burning tobacco or wood produces naphthalene. It occurs in crude oil, from which it may be recovered directly as white flakes; it can also be isolated from cracked petroleum, coke-oven emissions, or from high-temperature carbonization of bituminous coal. The major products made from naphthalene are moth repellents. It is also used for making dyes, resins, leather, tanning agents, and the insecticide carbaryl.

Naphthalene can be absorbed by the oral, inhalation, and dermal routes of exposure and can cross the placenta in amounts sufficient to cause fetal toxicity. Exposure to large amounts of naphthalene may damage or destroy some red blood cells, causing a low level until the body replaces the destroyed cells.

People, particularly children, have developed this problem after eating naphthalene-containing mothballs or deodorant blocks. Some of the symptoms of this problem are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause neurotoxic effects (confusion, lethargy, listlessness, vertigo), gastrointestinal distress, hepatic effects (jaundice, hepatomegaly, elevated serum enzyme levels), renal effects, and ocular effects (cataracts, optical atrophy). The estimated lethal dose of naphthalene is 5-15 g for adults and 2-3 g for children. Animals sometimes develop cloudiness in their eyes after swallowing naphthalene. It is not clear if this also develops in people. When mice were repeatedly exposed to naphthalene vapors for 2 years, their noses and lungs became inflamed and irritated.

Available cancer bioassays were insufficient to assess the carcinogenicity of naphthalene. Using EPA's 1996 Proposed Guidelines for Carcinogen Risk Assessment, the human carcinogenic potential of naphthalene via the oral or inhalation routes "cannot be determined" at this time based on human and animal data. There is suggestive evidence (observations of benign respiratory tumors and one carcinoma in female mice only exposed to naphthalene by inhalation) that naphthalene may cause cancer. Additional support includes increase in respiratory tumors associated with exposure to 1-methylnaphthalene.

Chronic RfDs for naphthalene are available from RAIS. The values used in the BHHRA for the oral, inhalation, and dermal routes were 2.00E-02, 8.57E-04, and 1.60E-02 mg/(kg × day). The dermal RfD was derived using a GI absorption factor of 80%.

D5.2.4 Pyrene (CAS 000129-00-0) (RAIS)

Pyrene, also known as benzo(def)phenanthrene, is a PAH with four aromatic carbon rings. Pure pyrene is a colorless crystalline solid at ambient temperature; the presence of tetracene, a common contaminant, gives it a yellow color. Pyrene can be derived from coal tar, but there is no commercial production or known commercial use of this compound. Pyrene from coal tar has been used as the starting material for the synthesis of benzo[a]pyrene.

Human exposure to pyrene occurs primarily through inhalation of tobacco smoke and polluted air and by ingestion of water polluted by combustion effluents. Pyrene is common in the environment as a product of incomplete combustion and has been identified in water, food, and in the air. Although a large body of literature exists on the toxicity and carcinogenicity of other PAHs, toxicity data for pyrene are limited. No human data were available that addressed the toxicity of pyrene. Subchronic oral exposure to pyrene produced nephropathy, decreased kidney weights, increased liver weights, and slight hematological changes in mice and produced fatty livers in rats. A single intraperitoneal injection of pyrene produced swelling and congestion of the liver and increased serum aspartate amino transferase and bilirubin levels in rats. No data were available concerning the toxic effects of inhalation exposure to pyrene.

No oral or inhalation bioassays were available to assess the carcinogenicity of pyrene in humans. Many studies involving different routes of pyrene exposure were done on animals. None of these studies saw an increase in tumor rates, but there is evidence that pyrene enhances the tumor causing ability of benzo[a]pyrene. Based on no human data and inadequate data from animal bioassays, EPA has placed pyrene in weight-of-evidence group D, not classifiable as to human carcinogenicity.

Chronic RfDs for pyrene are available from EPA's IRIS. The values used in the BHHRA for the oral and dermal routes were 3.00E-02 and 9.30E-03 mg/(kg × day). The dermal RfD was derived using a GI absorption factor of 31%.

D5.3 RADIONUCLIDES

Radionuclides are unstable atoms of chemical elements that will emit charged particles or energy or both to achieve a more stable state. These charged particles are termed “alpha and beta radiation”; energy is termed “neutral gamma rays.” Interaction of these charged particles (and gamma rays) with matter will produce ionization events, or radiation, which may cause living cell tissue damage. Because the deposition of energy by ionizing radiation is a random process, sufficient energy may be deposited (in a critical volume) within a cell and result in cell modification or death. In addition, ionizing radiation has sufficient energy that interactions with matter will produce an ejected electron and a positively charged ion (known as free radicals) that are highly reactive and may combine with other elements, or compounds within a cell, to produce toxins or otherwise disrupt the overall chemical balance of the cell. These free radicals also can react with deoxyribonucleic acid (DNA), causing genetic damage, cancer induction, or even cell death.

Radionuclides are characterized by the type and energy level of the radiation emitted. Radiation emissions fall into two major categories: particulate (electrons, alpha particles, beta particles, and protons) or electromagnetic radiation (gamma and x-rays). Therefore, all radionuclides are classified by the EPA as Group A carcinogens based on their property of emitting ionizing radiation and on the extensive weight of evidence provided by epidemiological studies of humans with cancers induced by high doses of radiation. Alpha particles are emitted at a characteristic energy level for differing radionuclides. The alpha particle has a charge of +2 and a comparably large size. Alpha particles have the ability to react (and/or ionize) with other molecules, but they have very little penetrating power and lack the ability to pass through a piece of paper or human skin. However, alpha-emitting radionuclides are of concern when there is a potential for inhalation or ingestion of the radionuclide. Alpha particles are directly ionizing and deposit their energy in dense concentrations [termed high linear energy transfer (LET)], resulting in short paths of highly localized ionization reactions. The probability of cell damage increases as a result of the increase in ionization events occurring in smaller areas; this also may be the reason for increased cancer incidence caused by inhalation of radon gas. In addition, the cancer incidence in smokers may be directly attributed to the naturally occurring alpha emitter, polonium-210, in common tobacco products.

Beta emissions generally refer to beta negative particle emissions. Radionuclides with an excess of neutrons achieve stability by beta decay. Beta radiation, like alpha radiation, is directly ionizing but, unlike alpha activity, beta particles deposit their energy along a longer track length (low LET), resulting in more space between ionization events. Beta-emitting radionuclides can cause injury to the skin and superficial body tissue, but are most destructive when inhaled or ingested. Many beta emitters are similar chemically to naturally occurring essential nutrients and will, therefore, tend to accumulate in certain specific tissues. For example, strontium-90 is chemically similar to calcium and, as a result, accumulates in the bones, where it causes continuous exposure. The health effects of beta particle emissions depend upon the target organ. Those seeking the bones would cause a prolonged exposure to the bone marrow and affect blood cell formation, possibly resulting in leukemia, other blood disorders, or bone cancers. Those seeking the liver would result in liver diseases or cancer, while those seeking the thyroid would cause thyroid and metabolic disorders. In addition, beta radiation may lead to damage of genetic material (DNA), causing hereditary defects.

Gamma emissions are the energy that has been released from transformations of the atomic nucleus. Gamma emitters and x-rays behave similarly, but differ in their origin: gamma emissions originate in nuclear transformations, and x-rays result from changes in the orbiting electron structure. Radionuclides that emit gamma radiation can induce internal and external effects. Gamma rays have high penetrating ability in living tissue and are capable of reaching all internal body organs. Without such sufficient shielding as lead, concrete, or steel, gamma radiation can penetrate the body from the outside and does not require ingestion or inhalation to penetrate sensitive organs. Gamma rays are characterized as low-

LET radiation, as is beta radiation; however, the behavior of beta radiation differs from that of gamma radiation in that beta particles deposit most of their energy in the medium through which they pass, while gamma rays often escape the medium because of higher energies, thereby creating difficulties in determining actual internal exposure. For this reason, direct whole-body measurements are necessary to detect gamma radiation, while urine/fecal analyses are usually effective in detecting beta radiation.

People receive gamma radiation continuously from naturally occurring radioactive decay processes going on in the earth's surface, from radiation naturally occurring inside their bodies, from the atmosphere as fallout from nuclear testing or explosions, and from space or cosmic sources. Cesium-137 (from nuclear fallout) decays to barium-137, the highest contributor to fallout-induced gamma radiation. Beta radiation from the soil is a less penetrating form of radiation, but has many contributing sources. Potassium-40, ¹³⁷Cs, lead-214, and bismuth-214 are among the most common environmental beta emitters. Tritium is also a beta emitter but contributes little to the soil beta radiation because of the low energy of its emission and its low concentration in the atmosphere. Alpha radiation also is emitted by the soil, but is not measurable more than a few centimeters from the ground surface. The majority of alpha emissions are attributable to radon-222 and radon-220 and their decay products. This contributes to what is called background exposure to radiation.

The general health effects of radiation can be divided into stochastic (related to dose) and nonstochastic (not related to dose) effects. The risk of development of cancer from exposure to radiation is a stochastic effect. Examples of nonstochastic effects include acute radiation syndrome and cataract formation, which occur only at high levels of exposures.

Radiation can damage cells in different ways. It can cause damage to DNA within the cell, and the cell either may not be able to recover from this type of damage or may survive but function abnormally. If an abnormally functioning cell divides and reproduces, a tumor or mutation in the tissue may develop. The rapidly dividing cells that line the intestines and stomach and the blood cells in bone marrow are extremely sensitive to this damage. Organ damage results from the damage caused to the individual cells. This type of damage has been reported with doses of 10 to 500 rads (0.1 to 5.0 gray, in SI units). Acute radiation sickness is seen only after doses of >50 rads (0.5 gray), which is a dose rate usually achieved only in a nuclear accident.

When the radiation-damaged cells are reproductive cells, genetic damage can occur in the offspring of the person exposed. The developing fetus is especially sensitive to radiation. The type of malformation that may occur is related to the stage of fetal development and the cells that are differentiating at the time of exposure. Radiation damage to children exposed in the womb is related to the dose the pregnant mother receives. Mental retardation is a possible effect of fetal radiation exposure.

The most widely studied population that has had known exposure to radiation is the atomic bomb survivors of Hiroshima and Nagasaki, Japan. Data indicate an increase in the rate of leukemia and cancers in this population. However, the rate at which cancer incidence is significantly affected by low radiation exposures, such as results of exposure to natural background and industrially contaminated sites, is still undergoing study and is uncertain. In studies conducted to determine the rate of cancer and leukemia increase, as well as genetic defects, several radionuclides must be considered.

D5.3.1 Americium-241 (CAS 014596-10-2) (EPA)

Americium is a man-made metal produced when plutonium atoms absorb neutrons in nuclear reactors and in nuclear weapons detonations. Americium has several different isotopes, all of which are radioactive. The most important isotope is ²⁴¹Am. Americium is a silver-white, crystalline metal that is solid under normal conditions. All isotopes of americium are radioactive. Americium-241 primarily emits alpha

particles, but also emits gamma rays. A mixture of ^{241}Am and beryllium emits neutrons. Americium-241 has a half-life of 432.7 years.

People may be directly exposed to gamma radiation from ^{241}Am by walking on contaminated land. They may also be exposed to both alpha and gamma radiation by breathing in americium contaminated dust, or drinking contaminated water. Because ^{241}Am was widely dispersed globally during the testing of nuclear weapons, only very minute amounts of it are found in the soil, plants, and water. Living near a weapons testing or production facility may increase your chance of exposure to ^{241}Am . People who live or work near a contaminated site, such as a former weapons production facility, may ingest ^{241}Am with food and water, or may inhale it as part of resuspended dust.

Once in the body, ^{241}Am tends to concentrate in the bone, liver, and muscle. It can stay in the body for decades and continue to expose the surrounding tissues to radiation, and increase your risk of developing cancer.

When inhaled, some ^{241}Am remains in the lungs, depending upon the particle size and the chemical form of the americium compound. The chemical forms that dissolve easily may pass into the bloodstream from the lungs. The chemical forms that dissolve less easily tend to remain in the lungs, or are coughed up through the lung's natural defense system, and swallowed. From the stomach swallowed americium may dissolve and pass into the bloodstream. However, undissolved material passes from the body through the feces. Americium-241 poses a significant risk if ingested (swallowed) or inhaled. It can stay in the body for decades and continue to expose the surrounding tissues to both alpha and gamma radiation, increasing the risk of developing cancer.

Oral, inhalation and external exposure cancer slope factors used in the BHHRA ^{241}Am are $9.10\text{E-}11$ risk/pCi, $2.81\text{E-}08$ risk/pCi and $2.76\text{E-}08$ risk/yr per pCi/g soil, respectively. A dermal cancer slope factor was not calculated because this route of exposure is not evaluated in the BHHRA. Oral and inhalation RfDs are available in EPA's IRIS.

D5.3.2 Cesium-137 (EPA)

Radioactive ^{137}Cs is produced when uranium and plutonium absorb neutrons and undergo fission. Examples of the uses of this process are nuclear reactors and nuclear weapons. The splitting of uranium and plutonium in fission creates numerous fission products. Cesium-137 is one of the more well-known fission products. Cesium, as well as ^{137}Cs , is a soft, malleable, silvery white metal. Cesium is one of only three metals that is a liquid near room temperature (83°F). The half-life of ^{137}Cs is 30 years

People may also be exposed from contaminated sites: Walking on ^{137}Cs contaminated soil could result in external exposure to gamma radiation. Leaving the contaminated area would prevent additional exposure. Coming in contact with waste materials at contaminated sites could also result in external exposure to gamma radiation. Leaving the area would also end the exposure. If ^{137}Cs contaminated soil becomes airborne as dust, breathing the dust would result in internal exposure. Because the radiation emitting material is then in the body, leaving the site would not end the exposure. Drinking ^{137}Cs contaminated water, also would place the ^{137}Cs inside the body, where it would expose living tissue to gamma and beta radiation.

People may ingest ^{137}Cs with food and water, or may inhale it as dust. If ^{137}Cs enters the body, it is distributed fairly uniformly throughout the body's soft tissues, resulting in exposure of those tissues. Slightly higher concentrations of the metal are found in muscle, while slightly lower concentrations are found in bone and fat. Compared to some other radionuclides, ^{137}Cs remains in the body for a relatively

short time. It is eliminated through the urine. Exposure to ^{137}Cs may also be external (that is, exposure to its gamma radiation from outside the body).

Like all radionuclides, exposure to radiation from ^{137}Cs results in increased risk of cancer. Everyone is exposed to very small amounts of ^{137}Cs in soil and water as a result of atmospheric fallout. Exposure to waste materials, from contaminated sites, or from nuclear accidents can result in cancer risks much higher than typical environmental exposures.

If exposures are very high, serious burns, and even death, can result. Instances of such exposure are very rare. One example of a high-exposure situation would be the mishandling a strong industrial ^{137}Cs source. The magnitude of the health risk depends on exposure conditions. These include such factors as strength of the source, length of exposure, distance from the source, and whether there was shielding between you and the source (such as metal plating).

Oral, inhalation and external exposure cancer slope factors used in the BHHRA for ^{137}Cs are $5.85\text{E-}14$ risk/pCi, $4.11\text{E-}14$ risk/pCi and risk/yr per pCi/g soil, respectively. A dermal cancer slope factor was not calculated because this route of exposure is not evaluated in the BHHRA. Oral and inhalation RfDs are available in EPA's IRIS.

D5.3.3 Neptunium-237 (CAS 013994-20-2)

Specific literary information for ^{237}Np is limited. However, available literature states that during neutron bombardment, ^{237}Np breaks down to ^{238}Pu , which produces small masses of high capacity energy that is useful for satellites and spacecraft (Moskalev et al. 1979).

The most common route of ^{237}Np exposure is inhalation of aerosols. According to studies conducted on rats, acute effects include injury to the liver and kidney and circulation disorders. Long-term effects include osteosarcomas and lung cancer. Extremely high doses cause immediate or premature death by destruction of the lungs (Moskalev et al. 1979).

Oral, inhalation, and external exposure cancer slope factors used in the BHHRA for ^{237}Np are $6.74\text{E-}11$ risk/pCi, $1.77\text{E-}08$ risk/pCi, and $7.97\text{E-}07$ [(risk \times g)/(pCi \times yr)], respectively. The slope factors for ^{237}Np include ingrowth of short-lived degradation products. A dermal cancer slope factor was not calculated because this route of exposure is not considered significant for radionuclides and is not evaluated in the BHHRA. Oral, dermal, and inhalation RfDs are not available for this element; therefore, systemic toxicity due to exposure to ^{237}Np is not quantified in the BHHRA.

D5.3.4 Plutonium-239 (CAS 015117-48-3) (EPA)

Plutonium is created from uranium in nuclear reactors. When ^{238}U absorbs a neutron, it becomes ^{239}U which ultimately decays to ^{239}Pu . Different isotopes of uranium and different combinations of neutron absorptions and radioactive decay, create different isotopes of plutonium.

Plutonium is a silvery-grey metal that becomes yellowish when exposed to air. It is solid under normal conditions, and is chemically reactive. Plutonium has at least 15 different isotopes, all of which are radioactive. The most common ones are ^{238}Pu , ^{239}Pu , and ^{240}Pu . Plutonium-238 has a half-life of 87.7 years. Plutonium-239 has a half-life of 24,100, and ^{240}Pu has a half-life 6,560 years. The isotope ^{238}Pu gives off useable heat, because of its radioactivity.

Plutonium-239 is used to make nuclear weapons. For example, the bomb dropped on Nagasaki, Japan, in 1945, contained ^{239}Pu . The plutonium in the bomb undergoes fission in an arrangement that assures enormous energy generation and destructive potential.

All isotopes of plutonium undergo radioactive decay. As plutonium decays, it releases radiation and forms other radioactive isotopes. For example, ^{238}Pu emits an alpha particle and becomes ^{234}U ; ^{239}Pu emits an alpha particle and becomes ^{235}U . This process happens slowly since the half-lives of plutonium isotopes tend to be relatively long; ^{238}Pu has a half-life of 87.7 years; ^{239}Pu has a half-life is 24,100 years, and ^{240}Pu has a half-life of 6,560 years. The decay process continues until a stable, non-radioactive element is formed.

People who live near nuclear weapons production or testing sites may have increased exposure to plutonium, primarily through particles in the air, but possibly from water as well. Plants growing in contaminated soil can absorb small amounts of plutonium.

People may inhale plutonium as a contaminant in dust. It also can be ingested with food or water. Most people have extremely low ingestion and inhalation of plutonium. However, people who live near government weapons production or testing facilities may have increased exposure. Plutonium exposure external to the body poses very little health risk.

The stomach does not absorb plutonium very well, and most plutonium swallowed with food or water passes from the body through the feces. When inhaled, plutonium can remain in the lungs depending upon its particle size and how well the particular chemical form dissolves. The chemical forms that dissolve less easily may lodge in the lungs or move out with phlegm, and either be swallowed or spit out. But, the lungs may absorb chemical forms that dissolve more easily and pass them into the bloodstream.

Once in the bloodstream, plutonium moves throughout the body and into the bones, liver, or other body organs. Plutonium that reaches body organs generally stays in the body for decades and continues to expose the surrounding tissue to radiation.

External exposure to plutonium poses very little health risk, since plutonium isotopes emit alpha radiation, and almost no beta or gamma radiation. In contrast, internal exposure to plutonium is an extremely serious health hazard. It generally stays in the body for decades, exposing organs and tissues to radiation, and increasing the risk of cancer. Plutonium is also a toxic metal, and may cause damage to the kidneys.

Oral, inhalation and external exposure cancer slope factors used in the BHHRA for ^{239}Pu are 3.33E-08 risk/pCi, 1.21E-10 risk/pCi and 2.00E-10 risk/yr per pCi/g soil, respectively. A dermal cancer slope factor was not calculated because this route of exposure is not evaluated in the BHHRA.

D5.3.5 Technetium-99 (CAS 014133-76-7) (EPA)

Technetium is a radioactive element that occurs in a number of isotopic forms. Technetium is found in some extraterrestrial material (i.e., stars); however, no appreciable amounts have been found in nature due to the relatively short half-lives of its radioactive isotopes (Kutegov et al. 1968). While no isotopes of technetium are stable, the existence of three technetium isotopes is well established. Two common forms of technetium, ^{97}Tc and ^{98}Tc , have half-lives of 2.6×10^6 and 1.5×10^6 years, respectively. The third isotope, ^{99}Tc , has a half-life of 2.12×10^5 years. None, however, possesses a half-life sufficiently long to allow technetium to occur naturally (Boyd 1959). Technetium is made artificially for industrial use, and natural technetium, particularly ^{99}Tc , has been identified and isolated from the spontaneous fission of

uranium, as well as other fissionable material or via the irradiation of molybdenum (Venugopal and Luckey 1978; Clarke and Podbielski 1988).

Technetium is an emitter of beta particles of low specific activity (Boyd 1959). It does not release nuclear energy at a rate sufficient to make the element attractive for the conventional applications of radioactivity (Boyd 1959). ⁹⁹Tc is the only long-lived isotope that is readily available and is the isotope on which most of the chemistry of technetium is based. Although gamma radiation has not been associated with ⁹⁹Tc, the secondary X rays may become important with larger amounts of the element.

Oral, inhalation, and external exposure cancer slope factors used in the BHHRA for ⁹⁹Tc are 2.75E-12 risk/pCi, 1.41E-11 risk/pCi, and 8.14E-11 ([risk × g]/[pCi × yr]), respectively. A dermal cancer slope factor was not calculated because this route of exposure is not evaluated in the BHHRA. Oral, dermal, and inhalation RfDs are not available for this element; therefore, systemic toxicity due to exposure to ⁹⁹Tc is not quantified in the BHHRA.

D5.3.6 Thorium (CAS 014274-82-9 for Thorium-228, CAS 014269-63-7 for Thorium-230, and CAS 007440-29-1 for Thorium-232, EPA and ATSDR)

Thorium is a soft, silvery white metal. Pure thorium will remain shiny for months in air, but if it contains impurities, it tarnishes to black when exposed to air. When heated, thorium oxide glows bright white, a property that makes it useful in lantern mantles. It dissolves slowly in water. Thorium-232 has a half-life of 14 billion (14×10^9) years, and decays by alpha emission, with accompanying gamma radiation. Thorium-232 is the top of a long decay series that contains key radionuclides such as ²²⁸Ra, its direct decay product, and ²²⁰Rn. Two other isotopes of thorium, which can be significant in the environment, are ²³⁰Th and thorium-228 (²²⁸Th). Both belong to other decay series. They also decay by alpha emission, with accompanying gamma radiation, and have half-lives of 75,400 years and 1.9 years, respectively. Only a small portion of naturally occurring thorium exists as ²³⁰Th. More than 99% of natural thorium exists in the form of ²³²Th. Thorium-230 breaks down into two parts—a small part called "alpha" radiation and a large part called the decay product. The decay product also is not stable and continues to break down through a series of decay products until a stable product is formed. During these decay processes, radioactive substances are produced. These include radium and radon. These substances give off radiation, including alpha and beta particles, and gamma radiation. The half-life for ²³⁰Th is 75,400 years.

Small amounts of thorium are present in all rocks, soil, water, plants, and animals. Soil contains an average of about 6 parts of thorium per million parts of soil (6 ppm). Where high concentrations occur in rock, thorium may be mined and refined, producing waste products such as mill tailings. If not properly controlled, wind and water can introduce the tailings into the wider environment. Commercial and federal facilities that have processed thorium also may have released thorium to the air, water, or soil. Man-made thorium isotopes are rare and almost never enter the environment.

Since thorium is naturally present in the environment, people are exposed to tiny amounts in air, food, and water. The amounts usually are very small and pose little health hazard. Thorium is also present in many consumer products such as ceramic glazes, lantern mantles, and welding rods. People who live near a facility that mines or mills thorium or manufactures products with thorium may receive higher exposures. Also, people who work with thorium in various industries may receive higher exposures.

People may inhale contaminated dust, or swallow thorium with food or water. Living near a thorium-contaminated site or working in an industry where thorium is used increases the chance of exposure to thorium.

If inhaled as dust, some thorium may remain in the lungs for long periods of time, depending on the chemical form. If ingested, thorium typically leaves the body through feces and urine within several days. The small amount of thorium left in the body will enter the bloodstream and be deposited in the bones where it may remain for many years. There is some evidence that the body may absorb thorium through the skin, but that would not likely be the primary means of entry.

The principal concern from low to moderate level exposure to ionizing radiation is increased risk of cancer. Studies have shown that inhaling thorium dust causes an increased risk of developing lung cancer and cancer of the pancreas. Bone cancer risk also is increased because thorium may be stored in bone.

Oral, inhalation, and external exposure cancer slope factors used in the BHHRA for ^{228}Th are $1.32\text{E-}07$ risk/pCi, $6.40\text{E-}11$ risk/pCi and $7.76\text{E-}06$ risk/yr per pCi/g soil, respectively. A dermal cancer slope factor was not calculated because this route of exposure is not evaluated in the BHHRA. Oral and inhalation RfDs are available in EPA's IRIS. Oral, inhalation, and external exposure cancer slope factors used in the BHHRA for ^{230}Th are $9.10\text{E-}11$ risk/pCi, $2.85\text{E-}08$ risk/pCi, and $8.19\text{E-}10$ (risk \times g)/(pCi \times yr), respectively. A dermal cancer slope factor was not calculated because this route of exposure is not considered significant for radionuclides and is not evaluated in the BHHRA. Oral, dermal, and inhalation RfDs are not available for this element; therefore, systemic toxicity due to exposure to americium is not quantified in the BHHRA. Oral and inhalation exposure cancer slope factors used in the BHHRA for ^{232}Th are $8.47\text{E-}11$ risk/pCi and $4.33\text{E-}08$ risk/pCi, respectively. A dermal cancer slope factor was not calculated because this route of exposure is not evaluated in the BHHRA.

D5.3.7 Uranium (CAS 007440-62-2 for metal, CAS 013966-29-5 for Uranium-234, CAS 015117-96-1 for Uranium-235, and CAS 007440-61-1 for Uranium-238) (ATSDR)

Uranium is a mildly radioactive element that occurs widely in the earth's crust. It is found in all soils, most rocks, and, in lesser concentrations, in water, vegetation, and animals, including humans. Uranium emits a low level of alpha particles and a much lower level of gamma rays. Alpha particles are unable to penetrate skin, but can travel short distances in the body if ingested or inhaled. Consequently, uranium represents a significant carcinogenic hazard only when taken into the body, where alpha particle energy is absorbed by small volumes of tissue. Although the penetrating (gamma) radiation of uranium is not considered to be significant (ATSDR 1989), one of its daughter radionuclides is a strong gamma emitter; therefore, gamma radiation may be a concern in areas containing uranium.

Natural uranium contains the uranium isotopes ^{238}U (which averages 99.27% of total uranium mass), ^{235}U (0.725%), and ^{234}U (0.0056%), each of which undergoes radioactive decay. Natural uranium, therefore, contains the radionuclide daughter products from the decay of ^{238}U and ^{235}U (Bowen 1979; ATSDR 1989). The half-lives of the isotopes are 200,000, 700 million, and 5 billion years for ^{234}U , ^{235}U , and ^{238}U , respectively.

Uranium is a radioactive element, but it also is a metallic element. Toxicological effects from the ingestion of uranium are the result of the action of uranium as a metal and its radioactive properties. The primary toxic chemical effect of uranium is seen in kidney damage. Studies in rabbits, mice, and dogs showed effects on the kidney to be dose-related. Fetal skeletal abnormalities and fetal death were found in pregnant mice exposed to 6 mg/kg or uranyl acetate dihydrate.

The primary human exposure studies to uranium have been studies of uranium miners or uranium factory workers. These studies have shown an increase in lung cancer deaths among these workers, which may be attributable to the decay of uranium into radon and its daughters. These workers are exposed to high levels of uranium dust and fumes and other radioactive elements in confined conditions (ATSDR 1989).

Oral, inhalation, and external exposure cancer slope factors used in the BHHRA for ^{234}U are 7.00E-11 risk/pCi, 1.14E-08 risk/pCi, and 2.52E-10 $([\text{risk} \times \text{g}]/[\text{pCi} \times \text{yr}])$, respectively. Oral, inhalation, and external exposure cancer slope factors used in the BHHRA for ^{238}U are 8.71E-11 risk/pCi, 9.25E-09 risk/pCi, and 1.14E-07 $([\text{risk} \times \text{g}]/[\text{pCi} \times \text{yr}])$, respectively. The slope factors for ^{238}U include ingrowth of short-lived degradation products. A dermal cancer slope factor was not calculated for the uranium isotopes because this route of exposure is not considered significant for radionuclides and is not evaluated in the BHHRA. Oral, dermal, and inhalation RfDs are available for uranium and are listed earlier in this section.

ATTACHMENT D6
RISK SUMMARIES

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Table D6.1. Summary of Risk Characterization for SWMU 1, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.49E-05	Cesium-137 Neptunium-237 Thorium-230 Uranium-238	46.0 9.9 21.4 7.8	Ingestion Inhalation Dermal External Exposure	23.7 5.3 5.4 65.6	<1	*no COCs			
Outdoor Worker - surface	3.35E-05	Cesium-137 Neptunium-237 PCB, Total Plutonium-239/240 Thorium-230 Uranium-238	15.3 3.7 3.2 11.3 59.8 5.0	Ingestion Inhalation Dermal External Exposure	74.9 1.8 1.8 21.6	<1	*no COCs			
Outdoor Worker - subsurface	6.08E-05	Arsenic Cesium-137 Neptunium-237 Plutonium-239/240 Thorium-230 Trichloroethene Uranium-238	26.7 8.4 2.0 6.2 33.0 18.3 2.8	Ingestion Inhalation Dermal External Exposure	62.1 18.1 7.8 11.9	<1	Arsenic Cobalt	14.2 25.6	Ingestion Inhalation Dermal	51.3 4.0 44.8

Table D6.1. Summary of Risk Characterization for SWMU 1, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	6.72E-05	Cesium-137	51.5	Ingestion	<1	Beryllium	95.3	Ingestion	2.6	
		Neptunium-237	11.1	Inhalation				Inhalation		0.2
		PCB, Total	4.1	Dermal				Dermal		97.2
		Plutonium-239/240	3.3	External Exposure						
		Thorium-230	18.3							
		Uranium-235	2.0							
Uranium-238	8.5									
Future Child Resident - surface	6.72E-05	Cesium-137	51.5	Ingestion	<1	Beryllium	92.9	Ingestion	9.7	
		Neptunium-237	11.1	Inhalation				Inhalation		0.4
		PCB, Total	4.1	Dermal				Dermal		89.9
		Plutonium-239/240	3.3	External Exposure						
		Thorium-230	18.3							
		Uranium-235	2.0							
Uranium-238	8.5									
Future Teen Recreational User - surface	3.14E-06	Cesium-137	45.8	Ingestion	<1	Beryllium	96.0	Ingestion	0.4	
				Inhalation				Inhalation		0.1
				Dermal				Dermal		99.5
				External Exposure						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.2. Summary of Risk Characterization for SWMU 1, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	9.96E-06	PCB, Total	96.2	Ingestion Inhalation Dermal External Exposure	6.3 10.6 83.1	<1	*no COCs			
Future Industrial Worker - surface	1.78E-04	Chromium PCB, Total	3.8 96.2	Ingestion Inhalation Dermal External Exposure	6.3 10.6 83.1	1.37	Beryllium Mercury Nickel Silver	14.0 48.1 9.8 22.5	Ingestion Inhalation Dermal	2.0 0.1 97.9
Outdoor Worker - surface	2.03E-04	Chromium PCB, Total	2.4 97.6	Ingestion Inhalation Dermal External Exposure	39.3 6.9 53.8	1.19	Beryllium Mercury Nickel Silver	13.0 46.3 9.1 20.9	Ingestion Inhalation Dermal	16.4 0.1 83.5
Outdoor Worker - subsurface	1.28E-03	Arsenic Chromium PCB, Total Trichloroethene Vinyl chloride	1.5 0.2 15.4 81.3 1.5	Ingestion Inhalation Dermal External Exposure	9.7 75.8 14.5	46.35	Arsenic cis-1,2-Dichloroeth Mercury Silver Trichloroethene	0.3 88.9 1.4 1.2 7.2	Ingestion Inhalation Dermal	11.4 59.7 28.9

Table D6.2. Summary of Risk Characterization for SWMU 1, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.60E-05	PCB, Total Trichloroethene	15.4 81.3	See Outdoor Worker (subsurface)	14.49	cis-1,2-Dichloroeth Mercury Silver Trichloroethene	88.9 1.4 1.2 7.2	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.16E-04	Chromium PCB, Total	2.5 97.5	Ingestion Inhalation Dermal External Exposure	2.36	Beryllium Mercury Nickel Silver	13.9 48.0 9.7 22.3	Ingestion Inhalation Dermal	3.3 0.1 96.7
Future Child Resident - surface	5.16E-04	Chromium PCB, Total	2.5 97.5	Ingestion Inhalation Dermal External Exposure	5.95	Beryllium Cadmium Mercury Nickel Silver Thallium Vanadium	13.3 2.2 46.8 9.3 21.4 1.7 2.0	Ingestion Inhalation Dermal	12.1 0.1 87.8
Future Teen Recreational User - surface	1.09E-04	Chromium PCB, Total	1.1 98.9	Ingestion Inhalation Dermal External Exposure	1.96	Beryllium Mercury Nickel Silver	14.1 48.4 9.8 22.7	Ingestion Inhalation Dermal	0.5 0.0 99.4

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.3. Summary of Risk Characterization for SWMU 1, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.65E-06	PCB, Total Uranium-238	43.6	Ingestion	7.1	<1	*no COCs			
			38.3	Inhalation	21.3					
Outdoor Worker - surface	3.17E-06	PCB, Total Uranium-238		Dermal	37.6	<1	*no COCs			
				External Exposure	33.9					
			42.2	Ingestion	42.5					
Outdoor Worker - subsurface	1.78E-05	Arsenic PCB, Total Uranium-238	46.6	Inhalation	13.2	<1	*no COCs			
				Dermal	23.3					
				External Exposure	21.0					
			84.5	Ingestion	72.7					
			7.2	Inhalation	0.4					
			8.3	Dermal	23.1					
				External Exposure	3.7					

Table D6.3. Summary of Risk Characterization for SWMU 1, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.33E-06	PCB, Total Uranium-238	36.4 53.6	Ingestion Inhalation Dermal External Exposure	12.2 11.7 27.4 48.6	<1	*no COCs			
Future Child Resident - surface	9.33E-06	PCB, Total Uranium-238	36.4 53.6	Ingestion Inhalation Dermal External Exposure	12.2 11.7 27.4 48.6	<1	*no COCs			
Future Teen Recreational User - surface	1.02E-06	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.4. Summary of Risk Characterization for SWMU 1, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	5.39E-06	Chromium Cobalt-60	57.2	Ingestion	6.7	<1	Nickel	79.7	Ingestion	1.0	
			23.1	Inhalation	58.7				Inhalation	0.4	
				Dermal	11.1				Dermal	98.6	
			23.5	External Exposure							
Outdoor Worker - surface	6.30E-06	Chromium Thorium-230	36.2	Ingestion	40.9	<1	*no COCs				
			36.4	Inhalation	37.2						
				Dermal	7.0						
				External Exposure	14.8						
Outdoor Worker - subsurface	1.15E-05	Cesium-137 Chromium Thorium-230 Trichloroethene	25.4	Ingestion	22.5	<1	*no COCs				
			15.1	Inhalation	39.9						
			19.9	Dermal	4.3						
			26.6	External Exposure	33.2						

Table D6.4. Summary of Risk Characterization for SWMU 1, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.57E-05	Chromium Cobalt-60 PCB, Total Thorium-230	38.1 40.0 13.0 9.0	Ingestion Inhalation Dermal External Exposure	<1	Nickel	79.7	Ingestion Inhalation Dermal	1.6 0.2 98.1
Future Child Resident - surface	1.57E-05	Chromium Cobalt-60 PCB, Total Thorium-230	38.1 40.0 13.0 9.0	Ingestion Inhalation Dermal External Exposure	<1	Nickel	80.0	Ingestion Inhalation Dermal	6.3 0.5 93.3
Future Teen Recreational User - surface	1.30E-06	*no COCs			<1	Nickel	79.6	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.5. Summary of Risk Characterization for SWMU 1, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.11E-06	PCB, Total Total PAH	46.2	Ingestion	7.1	<1	Beryllium	66.4	Ingestion	1.2
			53.4	Inhalation	3.8			Inhalation	0.4	
				Dermal External Exposure	89.1			Dermal	98.4	
Outdoor Worker - surface	3.70E-06	PCB, Total Total PAH	45.0	Ingestion	42.2	<1	Beryllium	65.4	Ingestion	10.8
			54.8	Inhalation	2.4			Inhalation	0.3	
				Dermal External Exposure	55.5			Dermal	88.9	
Outdoor Worker - subsurface	4.40E-05	Arsenic PCB, Total Total PAH	91.5	Ingestion	74.2	<1	Arsenic Beryllium Cobalt Manganese	26.4	Ingestion	51.5
			3.8	Inhalation	0.3			Inhalation	4.4	
			4.6	Dermal	25.4			Dermal	44.1	
				External Exposure					11.6	

Table D6.5. Summary of Risk Characterization for SWMU 1, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	9.31E-06	PCB, Total Total PAH	45.4 54.3	Ingestion	1.21	Beryllium Nickel	66.3 32.6	Ingestion	7.8	
				Inhalation				Inhalation		Inhalation
				Dermal External Exposure				Dermal		Dermal
Future Child Resident - surface	9.31E-06	PCB, Total Total PAH	45.4 54.3	Ingestion	1.21	Beryllium Nickel	65.7 32.3	Ingestion	7.8	
				Inhalation				Inhalation		Inhalation
				Dermal External Exposure				Dermal		Dermal
Future Teen Recreational User - surface	2.00E-06	Total PAH	54.7	Ingestion	<1	Beryllium Nickel	66.5 32.6	Ingestion	0.3	
				Inhalation				Inhalation		Inhalation
				Dermal External Exposure				Dermal		Dermal

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.6. Summary of Risk Characterization for SWMU 99

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.06E-06	Chromium	59.6	Ingestion	2.0	1.33	Mercury Nickel	79.9	Ingestion	1.4
				Inhalation	59.9			12.4	Inhalation	0.1
				Dermal External Exposure	38.1				Dermal	98.6
Outdoor Worker - surface	2.66E-06	Chromium	50.8	Ingestion	16.6	1.10	Mercury Nickel	80.4	Ingestion	11.8
				Inhalation	51.0			12.1	Inhalation	0.1
				Dermal External Exposure	32.4				Dermal	88.1
Outdoor Worker - subsurface	2.68E-05	Arsenic Chromium	89.4 5.8	Ingestion	70.7	1.43	Arsenic Mercury Nickel	10.5	Ingestion	22.8
				Inhalation	5.8			61.7	Inhalation	1.0
				Dermal External Exposure	20.3 3.2			11.2	Dermal	76.2

Table D6.6. Summary of Risk Characterization for SWMU 99 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	61.7	See Outdoor Worker (subsurface) for %			
Future Adult Resident - surface	9.69E-06	Chromium Cobalt-60 Uranium-238	36.6	Ingestion	2.27	Mercury	80.0	Ingestion	2.3		
			35.1	Inhalation		Nickel		12.3		Inhalation	0.0
			28.2	Dermal		Silver		7.2		Dermal	97.7
Future Child Resident - surface	9.69E-06	Chromium Cobalt-60 Uranium-238	36.6	Ingestion	5.57	Mercury	80.3	Ingestion	8.6		
			35.1	Inhalation		Nickel		12.2		Inhalation	0.1
			28.2	Dermal		Silver		7.1		Dermal	91.3
Future Teen Recreational User - surface	<1E-6	*no COCs			1.91	Mercury Nickel Silver	79.9 12.4 7.2	Ingestion Inhalation Dermal	0.4 0.0 99.6		

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.7. Summary of Risk Characterization for SWMU 99, Pipeline Borings

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface	1.12E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			

Table D6.7. Summary of Risk Characterization for SWMU 99, Pipeline Borings (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

There are no surface data available for assessment.
 Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.8. Summary of Risk Characterization for SWMU 194, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.29E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	100.0	1.05	Mercury Nickel Silver	71.2 13.0 9.7	Ingestion Inhalation Dermal	1.5 0.1 98.5
Outdoor Worker - surface	<1E-6	*no COCs				<1	Mercury Nickel	71.2 12.6	Ingestion Inhalation Dermal	12.4 0.1 87.5
Outdoor Worker - subsurface	2.58E-05	Arsenic Chromium	95.1 4.9	Ingestion Inhalation Dermal External Exposure	73.5 4.9 21.6	1.11	Arsenic Mercury Nickel	13.8 56.1 10.4	Ingestion Inhalation Dermal	25.3 1.0 73.8

Table D6.8. Summary of Risk Characterization for SWMU 194, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	56.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.50E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	1.80	Antimony Mercury Nickel Silver	5.7 71.2 13.0 9.7	Ingestion Inhalation Dermal	2.4 0.0 97.6
Future Child Resident - surface	2.50E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	4.42	Antimony Mercury Nickel Silver	6.1 71.2 12.8 9.5	Ingestion Inhalation Dermal	9.0 0.1 90.9
Future Teen Recreational User - surface	<1E-6	*no COCs			1.51	Mercury Nickel Silver	71.2 13.0 9.7	Ingestion Inhalation Dermal	0.4 0.0 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.9. Summary of Risk Characterization for SWMU 194, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1				
Future Industrial Worker - surface	2.81E-06	Chromium	70.3	Ingestion	3.3	<1	Silver	81.2	Ingestion	3.3
				Inhalation	70.4				Inhalation	0.1
				Dermal					Dermal	96.6
Outdoor Worker - surface	2.67E-06	Chromium Uranium-238	54.7 45.3	Ingestion	24.8	<1	*no COCs			
				Inhalation	54.8					
				Dermal						
Outdoor Worker - subsurface	2.71E-05	Arsenic Chromium Uranium-238	90.7 5.4 3.9	External Exposure	20.5	1.05	Arsenic Mercury Silver	14.6 60.7 9.9	Ingestion	27.4
				Ingestion	72.2				Inhalation	1.1
				Inhalation	5.5				Dermal	71.5
				Dermal	1.8					

Table D6.9. Summary of Risk Characterization for SWMU 194, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	60.7	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	7.94E-06	Chromium Uranium-238	48.3 51.7	Ingestion	<1	Silver	80.0	Ingestion	5.4	
				Inhalation				Inhalation		0.0
				Dermal External Exposure				Dermal		94.6
Future Child Resident - surface	7.94E-06	Chromium Uranium-238	48.3 51.7	Ingestion	<1	Silver Uranium	72.3 23.7	Ingestion	18.8	
				Inhalation				Inhalation		0.1
				Dermal External Exposure				Dermal		81.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Silver	82.6	Ingestion Inhalation Dermal	0.9 0.0 99.1	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.10. Summary of Risk Characterization for SWMU 194, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.74E-05	Arsenic Chromium	84.4	Ingestion	22.8	<1	Nickel	54.6	Ingestion	9.6
			7.4	Inhalation	7.6			Inhalation	0.7	
				Dermal External Exposure	65.7 3.8			Dermal	89.7	
Outdoor Worker - surface	3.81E-05	Arsenic Uranium-238	92.5	Ingestion	74.0	<1	Arsenic Nickel	59.5	Ingestion	50.5
			2.9	Inhalation	2.6			Inhalation	0.4	
				Dermal External Exposure	22.2 1.3			Dermal	49.1	
Outdoor Worker - subsurface	3.97E-05	Arsenic Cesium-137 Chromium	87.5	Ingestion	69.8	<1	Arsenic Nickel	59.9	Ingestion	50.6
			5.1	Inhalation	3.1			Inhalation	0.4	
			3.1	Dermal External Exposure	20.8 6.2			Dermal	49.0	

Table D6.10. Summary of Risk Characterization for SWMU 194, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.04E-05	Arsenic	88.3	Ingestion	<1	Arsenic	37.0	Ingestion	15.0
		Chromium	3.6	Inhalation		Nickel	51.8	Inhalation	0.4
		Total PAH	2.9	Dermal				Dermal	84.7
		Uranium-238	5.3	External Exposure					
Future Child Resident - surface	7.04E-05	Arsenic	88.3	Ingestion	1.65	Antimony	7.6	Ingestion	41.6
		Chromium	3.6	Inhalation		Arsenic	53.9	Inhalation	0.5
		Total PAH	2.9	Dermal		Nickel	37.4	Dermal	57.9
		Uranium-238	5.3	External Exposure					
Future Teen Recreational User - surface	9.08E-06	Arsenic	90.9	Ingestion	<1	Arsenic	29.2	Ingestion	2.7
				Inhalation		Nickel	58.5	Inhalation	0.2
				Dermal				Dermal	97.1
				External Exposure					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.11. Summary of Risk Characterization for SWMU 194, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.86E-06	Chromium	41.6	Ingestion	5.4	1.27	Mercury	78.2	Ingestion	1.4
		Total PAH	31.9	Inhalation	41.9		Nickel	12.7	Inhalation	0.1
		Uranium-238	26.3	Dermal	29.5		Silver	8.6	Dermal	98.6
Outdoor Worker - surface	4.17E-06	Chromium	28.5	Ingestion	35.2	1.05	Mercury	78.8	Ingestion	11.8
		Total PAH	36.1	Inhalation	28.7		Nickel	12.4	Inhalation	0.1
		Uranium-238	35.4	Dermal	20.2				Dermal	88.2
				External Exposure	16.0					
Outdoor Worker - subsurface	2.87E-05	Arsenic	85.8	Ingestion	68.9	1.47	Arsenic	10.4	Ingestion	27.1
		Cesium-137	4.3	Inhalation	4.8		Iron	9.2	Inhalation	0.7
		Chromium	4.8	Dermal	20.6		Mercury	56.1	Dermal	72.2
				External Exposure	5.7		Nickel	10.4		

Table D6.11. Summary of Risk Characterization for SWMU 194, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	56.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.19E-05	Chromium Total PAH Uranium-238	26.2 31.6 42.1	Ingestion Inhalation Dermal External Exposure	2.17	Mercury Nickel Silver	78.3 12.7 8.6	Ingestion Inhalation Dermal	2.2 0.0 97.7
Future Child Resident - surface	1.19E-05	Chromium Total PAH Uranium-238	26.2 31.6 42.1	Ingestion Inhalation Dermal External Exposure	5.32	Mercury Nickel Silver	78.6 12.5 8.5	Ingestion Inhalation Dermal	8.5 0.1 91.4
Future Teen Recreational User - surface	1.31E-06	*no COCs			1.82	Mercury Nickel Silver	78.2 12.7 8.7	Ingestion Inhalation Dermal	0.4 0.0 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.12. Summary of Risk Characterization for SWMU 194, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.74E-06	Chromium	55.5	Ingestion	4.4	1.26	Mercury Nickel Silver	76.5	Ingestion	1.4
				Inhalation	55.9			14.0	Inhalation	0.1
				Dermal	13.5			9.2	Dermal	98.6
Outdoor Worker - surface	2.79E-06	Chromium Uranium-238	40.2	Ingestion	30.7	1.04	Mercury Nickel	77.1	Ingestion	11.7
			42.1	Inhalation	40.5			13.6	Inhalation	0.1
				Dermal	9.8				Dermal	88.2
Outdoor Worker - subsurface	3.50E-05	Arsenic Chromium Total PAH	66.9	Ingestion	64.8	1.36	Arsenic Mercury Nickel	10.8	Ingestion	24.0
			3.9	Inhalation	4.0			59.4	Inhalation	1.9
			26.5	Dermal	30.0			10.5	Dermal	74.1
			1.2	External Exposure	1.2					

Table D6.12. Summary of Risk Characterization for SWMU 194, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	59.4	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	8.17E-06	Chromium Total PAH Uranium-238	36.1 14.9 48.8	7.8	2.16	Mercury Nickel Silver	76.5 13.9 9.1	2.2	8.5	
				36.3				Inhalation		0.0
				11.6				Dermal		97.7
Future Child Resident - surface	8.17E-06	Chromium Total PAH Uranium-238	36.1 14.9 48.8	44.3	5.30	Mercury Nickel Silver	76.9 13.7 9.0	8.5	8.5	
				7.8				Ingestion		0.1
				36.3				Inhalation		0.1
Future Teen Recreational User - surface	<1E-6	*no COCs		11.6	1.82	Mercury Nickel Silver	76.4 13.9 9.2	0.4	0.4	
				44.3				External Exposure		0.0
				44.3				External Exposure		99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.13. Summary of Risk Characterization for SWMU 194, EU 6

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1				
Future Industrial Worker - surface	2.01E-06	Chromium	61.0	Ingestion	4.3	<1	Nickel	57.7	Ingestion	2.1
				Inhalation	61.5				Inhalation	7.6
				Dermal					Dermal	90.3
Outdoor Worker - surface	2.04E-06	Uranium-238	55.2	External Exposure	34.2	<1	Nickel	53.4	Ingestion	16.8
				Ingestion	30.2				Inhalation	6.5
				Inhalation	44.9				Dermal	76.7
Outdoor Worker - subsurface	<1E-6			External Exposure	24.9	<1	Nickel	47.7	Ingestion	19.3
									Inhalation	8.4
									Dermal	72.4

Table D6.13. Summary of Risk Characterization for SWMU 194, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.21E-06	Chromium Uranium-238	38.3	Ingestion	<1	Nickel Silver	59.2	Ingestion	3.5
			61.4	Inhalation			29.0	Inhalation	4.3
				Derma External Exposure				Derma	92.3
Future Child Resident - surface	6.21E-06	Chromium Uranium-238	38.3	Ingestion	1.43	Manganese Nickel Silver	18.0	Ingestion	12.3
			61.4	Inhalation			54.3	Inhalation	7.6
				Derma External Exposure				Derma	80.2
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	61.4	Ingestion	0.6
							30.1	Inhalation	2.1
								Derma	97.3

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.14. Summary of Risk Characterization for SWMU 194, EU 7

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.77E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel Silver	59.5 38.4	Ingestion	1.0 0.3 98.7
				Inhalation						
				Dermal External Exposure						
Outdoor Worker - surface	1.31E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	59.6	Ingestion	9.1 0.3 90.6
				Inhalation						
				Dermal External Exposure						
Outdoor Worker - subsurface	2.59E-05	Arsenic Chromium	94.9 5.0	Ingestion	73.3 5.1 21.5	<1	Arsenic Nickel	35.1 33.2	Ingestion	36.6 3.2 60.2
				Inhalation						
				Dermal External Exposure						

Table D6.14. Summary of Risk Characterization for SWMU 194, EU 7 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.44E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	59.5 38.4	Ingestion Inhalation Dermal	1.7 0.2 98.1
Future Child Resident - surface	3.44E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	1.25	Nickel Silver	59.6 38.4	Ingestion Inhalation Dermal	6.5 0.3 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	59.4 38.5	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.15. Summary of Risk Characterization for SWMU 194, EU 8

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.12E-05	Chromium Total PAH	15.9	Ingestion	6.7	<1	*no COCs			
			73.4	Inhalation Dermal External Exposure	16.0 70.8 6.5					
Outdoor Worker - surface	1.30E-05	Chromium Total PAH Uranium-238	10.1	Ingestion	40.8	<1	*no COCs			
			76.8 9.1	Inhalation Dermal External Exposure	10.2 44.9 4.1					
Outdoor Worker - subsurface	3.94E-05	Arsenic Cesium-137 Chromium Total PAH Uranium-238	66.5	Ingestion	62.1	<1	Arsenic Cobalt Nickel	26.9 38.1 18.7	Ingestion Inhalation Dermal	54.5 4.1 41.4
			6.1 3.8 19.6 2.6	Inhalation Dermal External Exposure	4.0 26.7 7.2					

Table D6.15. Summary of Risk Characterization for SWMU 194, EU 8 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.36E-05	Bis(2-ethylhexyl)p Chromium Total PAH Uranium-238	3.6 10.2 74.2 11.9	Ingestion Inhalation Dermal External Exposure	18.6 10.3 60.3 10.8	<1	*no COCs			
Future Child Resident - surface	3.36E-05	Bis(2-ethylhexyl)p Chromium Total PAH Uranium-238	3.6 10.2 74.2 11.9	Ingestion Inhalation Dermal External Exposure	18.6 10.3 60.3 10.8	<1	Manganese	79.9	Ingestion Inhalation Dermal	34.8 32.2 33.0
Future Teen Recreational User - surface	6.13E-06	Total PAH	88.0	Ingestion Inhalation Dermal External Exposure	2.1 5.3 90.1 2.5	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.16. Summary of Risk Characterization for SWMU 194, EU 9

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.32E-05	Arsenic Chromium	87.0	Ingestion	22.7	<1	*no COCs			
			13.0	Inhalation Dermal External Exposure	13.2 64.1					
Outdoor Worker - surface	2.88E-05	Arsenic Chromium	95.6	Ingestion	73.9	<1	Arsenic	97.4	Ingestion Inhalation Dermal	75.1 0.4 24.6
			4.4	Inhalation Dermal External Exposure	4.4 21.7					
Outdoor Worker - subsurface	2.47E-05	Arsenic Chromium	95.5	Ingestion	73.8	<1	Arsenic Nickel	39.5 30.3	Ingestion Inhalation Dermal	38.9 2.7 58.4
			4.5	Inhalation Dermal External Exposure	4.5 21.7					

Table D6.16. Summary of Risk Characterization for SWMU 194, EU 9 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.18E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.8	<1	Arsenic	93.2	Ingestion	34.2
				Inhalation	6.5				Inhalation	0.5
				Dermal External Exposure	41.8				Dermal	65.3
Future Child Resident - surface	5.18E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.8	<1	Arsenic	96.6	Ingestion	67.8
				Inhalation	6.5				Inhalation	0.5
				Dermal External Exposure	41.8				Dermal	31.7
Future Teen Recreational User - surface	6.76E-06	Arsenic	95.4	Ingestion	8.1	<1	*no COCs			
				Inhalation	4.7					
				Dermal External Exposure	87.2					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.17. Summary of Risk Characterization for SWMU 194, EU 10

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.42E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.54E-05	Arsenic	48.1	Ingestion	14.3	<1	Nickel	68.7	Ingestion	8.4
		Cesium-137	26.6	Inhalation	4.9				Inhalation	0.7
		Chromium	4.7	Dermal	51.2				Dermal	90.9
		Total PAH	17.1	External Exposure	29.6					
Outdoor Worker - surface	4.18E-05	Arsenic	70.1	Ingestion	61.5	<1	Arsenic Nickel	55.5	Ingestion	46.8
		Cesium-137	12.1	Inhalation	2.2				Inhalation	0.4
		Total PAH	12.7	Dermal	23.0				Dermal	52.8
		Uranium-238	3.0	External Exposure	13.3					
Outdoor Worker - subsurface	3.94E-05	Arsenic	67.4	Ingestion	59.9	1.09	Arsenic Mercury Nickel	15.2	Ingestion	23.3
		Cesium-137	12.8	Inhalation	3.2				Inhalation	0.1
		Chromium	3.1	Dermal	22.8				Dermal	76.6
		Total PAH	13.5	External Exposure	14.1					
Uranium-238	3.2									

Table D6.17. Summary of Risk Characterization for SWMU 194, EU 10 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	68.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.06E-04	Arsenic	48.9	Ingestion	<1	Arsenic Nickel	32.8 65.6	Ingestion	13.2
		Cesium-137	32.2	Inhalation				Inhalation	0.4
		Chromium	2.2	Dermal				Dermal	86.5
		Total PAH	12.5	External Exposure					
		Uranium-238	4.1						
Future Child Resident - surface	1.06E-04	Arsenic	48.9	Ingestion	1.49	Arsenic Nickel	49.7 49.2	Ingestion	38.1
		Cesium-137	32.2	Inhalation				Inhalation	0.5
		Chromium	2.2	Dermal				Dermal	61.4
		Total PAH	12.5	External Exposure					
		Uranium-238	4.1						
Future Teen Recreational User - surface	1.15E-05	Arsenic	59.5	Ingestion	<1	Nickel	72.8	Ingestion	2.4
		Cesium-137	12.3	Inhalation				Inhalation	0.2
		Total PAH	24.8	Dermal				Dermal	97.5
				External Exposure					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.18. Summary of Risk Characterization for SWMU 194, EU 11

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.88E-06	Chromium Total PAH	37.6 46.6	Ingestion Inhalation Dermal External Exposure	4.5 39.1 56.4	1.26	Mercury Nickel Silver	71.3 18.6 9.8	Ingestion Inhalation Dermal	1.3 0.1 98.6
Outdoor Worker - surface	2.97E-06	Total PAH	55.3	Ingestion Inhalation Dermal External Exposure	31.3 28.1 40.6	1.04	Mercury Nickel	71.9 18.2	Ingestion Inhalation Dermal	11.6 0.1 88.3
Outdoor Worker - subsurface	2.95E-05	Arsenic Chromium Total PAH	88.0 4.7 5.6	Ingestion Inhalation Dermal External Exposure	71.1 4.9 24.0	1.23	Arsenic Mercury Nickel	13.2 60.9 15.4	Ingestion Inhalation Dermal	21.3 0.1 78.6

Table D6.18. Summary of Risk Characterization for SWMU 194, EU 11 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	60.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.53E-06	Chromium PCB, Total Total PAH	27.9 17.5 54.3	Ingestion Inhalation Dermal External Exposure	2.16	Mercury Nickel Silver	71.3 18.6 9.8	Ingestion Inhalation Dermal	2.2 0.1 97.7
Future Child Resident - surface	7.53E-06	Chromium PCB, Total Total PAH	27.9 17.5 54.3	Ingestion Inhalation Dermal External Exposure	5.29	Mercury Nickel Silver	71.7 18.4 9.6	Ingestion Inhalation Dermal	8.4 0.1 91.5
Future Teen Recreational User - surface	1.36E-06	*no COCs			1.82	Mercury Nickel Silver	71.2 18.6 9.8	Ingestion Inhalation Dermal	0.4 0.0 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.19. Summary of Risk Characterization for SWMU 194, EU 12

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.72E-05	Chromium Total PAH	12.2	Ingestion	6.6	<1	Nickel Silver	60.7	Ingestion	1.0
			87.7	Inhalation	12.4			36.8	Inhalation	0.3
				Dermal External Exposure	81.0				Dermal	98.7
Outdoor Worker - surface	1.99E-05	Chromium Total PAH	7.8	Ingestion	40.5	<1	Nickel	60.8	Ingestion	9.1
			92.2	Inhalation	7.9			0.3	Inhalation	
				Dermal External Exposure	51.6				Dermal	90.6
Outdoor Worker - subsurface	3.83E-05	Arsenic Chromium Total PAH	57.8	Ingestion	61.4	<1	Arsenic Nickel Silver	31.1	Ingestion	33.5
			4.1	Inhalation	4.1			33.3	Inhalation	3.0
			38.1	Dermal External Exposure	34.4			25.9	Dermal	63.5

Table D6.19. Summary of Risk Characterization for SWMU 194, EU 12 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	4.99E-05	Chromium Total PAH	8.2 91.8	Ingestion	1.25	Nickel Silver	60.7	Ingestion	60.7	
				Inhalation				Inhalation		0.2
				Derma External Exposure				Derma		98.1
Future Child Resident - surface	4.99E-05	Chromium Total PAH	8.2 91.8	Ingestion	1.25	Nickel Silver	60.8	Ingestion	60.8	
				Inhalation				Inhalation		0.3
				Derma External Exposure				Derma		93.1
Future Teen Recreational User - surface	1.03E-05	Total PAH	96.3	Ingestion	<1	Nickel Silver	60.6	Ingestion	60.6	
				Inhalation				Inhalation		0.1
				Derma External Exposure				Derma		99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.20. Summary of Risk Characterization for SWMU 194, EU 13

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.13E-06	Chromium Total PAH	50.5	Ingestion	3.7	<1	Nickel	96.2	Ingestion	1.0
			49.3	Inhalation	50.8			Inhalation	0.5	
				Dermal External Exposure	45.5			Dermal	98.5	
Outdoor Worker - surface	3.06E-06	Chromium Total PAH	38.2	Ingestion	27.1	<1	Nickel	96.4	Ingestion	9.0
			61.6	Inhalation	38.4			Inhalation	0.5	
				Dermal External Exposure	34.5			Dermal	90.6	
Outdoor Worker - subsurface	2.68E-05	Arsenic Chromium Total PAH	89.1	Ingestion	71.1	<1	Arsenic Nickel	47.5	Ingestion	45.2
			5.7	Inhalation	5.8			Inhalation	3.5	
			5.2	Dermal External Exposure	23.1			Dermal	51.3	

Table D6.20. Summary of Risk Characterization for SWMU 194, EU 13 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	7.78E-06	Chromium Total PAH	39.4 60.4	Ingestion	<1	Nickel	96.2	Ingestion	1.7	
				Inhalation				Inhalation		0.3
				Dermal External Exposure				Dermal		98.1
Future Child Resident - surface	7.78E-06	Chromium Total PAH	39.4 60.4	Ingestion	<1	Nickel	96.3	Ingestion	6.5	
				Inhalation				Inhalation		0.5
				Dermal External Exposure				Dermal		93.0
Future Teen Recreational User - surface	1.30E-06	Total PAH	77.8	Ingestion	<1	Nickel	96.1	Ingestion	0.3	
				Inhalation				Inhalation		0.1
				Dermal External Exposure				Dermal		99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.21. Summary of Risk Characterization for SWMU 194, EU 14

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.73E-06	Chromium	100.0	Ingestion	100.0	<1	Mercury	99.3	Ingestion	1.5
				Inhalation					Inhalation	
Outdoor Worker - surface	1.28E-06	Chromium	100.0	Derma External Exposure	100.0	<1	Mercury	99.4	Derma	87.6
				Ingestion					Ingestion	
Outdoor Worker - subsurface	2.76E-05	Arsenic Chromium	94.6 5.4	Ingestion	73.1	1.26	Arsenic Mercury Nickel	12.9 65.5 10.6	Ingestion	25.9
				Inhalation					Inhalation	
				Derma External Exposure					Derma	

Table D6.21. Summary of Risk Characterization for SWMU 194, EU 14 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	65.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.35E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	1.56	Mercury	99.3	Ingestion Inhalation Dermal	2.4 97.6
Future Child Resident - surface	3.35E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	3.84	Mercury	99.4	Ingestion Inhalation Dermal	9.0 91.0
Future Teen Recreational User - surface	<1E-6	*no COCs			1.31	Mercury	99.3	Ingestion Inhalation Dermal	0.4 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario. Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.22. Summary of Risk Characterization for SWMU 194, EU 15

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.77E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.31E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.31E-05	Arsenic Chromium	93.5 6.4	Ingestion Inhalation Dermal External Exposure	72.3 6.5 21.2	<1	Arsenic Nickel	32.9 36.8	Ingestion Inhalation Dermal	34.5 2.7 62.8

Table D6.22. Summary of Risk Characterization for SWMU 194, EU 15 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.43E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Silver	93.9	Ingestion Inhalation Dermal	1.6 98.4
Future Child Resident - surface	3.43E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Silver	94.1	Ingestion Inhalation Dermal	6.4 93.6
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Silver	93.8	Ingestion Inhalation Dermal	0.3 99.7

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.23. Summary of Risk Characterization for SWMU 194, EU 16

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.33E-05	Arsenic Chromium	86.7	Ingestion	22.7	<1	Nickel	50.6	Ingestion	8.9
			13.2	Inhalation	13.4			Inhalation	0.5	
				Dermal External Exposure	63.9			Dermal	90.6	
Outdoor Worker - surface	2.91E-05	Arsenic Chromium	95.5	Ingestion	73.8	<1	Arsenic Nickel	39.9	Ingestion	48.4
			4.5	Inhalation	4.6			Inhalation	0.3	
				Dermal External Exposure	21.7			Dermal	51.3	
Outdoor Worker - subsurface	2.77E-05	Arsenic Chromium	95.3	Ingestion	73.6	<1	Arsenic Nickel	27.6	Ingestion	39.9
			4.7	Inhalation	4.8			Inhalation	5.0	
				Dermal External Exposure	21.6			Dermal	55.1	

Table D6.23. Summary of Risk Characterization for SWMU 194, EU 16 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.24E-05	Arsenic Chromium	93.4 6.5	Ingestion	<1	Arsenic Nickel	24.1 48.2	Ingestion	13.9 0.3 85.8
				Inhalation				Inhalation	
				Dermal External Exposure				Dermal	
Future Child Resident - surface	5.24E-05	Arsenic Chromium	93.4 6.5	Ingestion	1.95	Antimony Arsenic Nickel Thallium Vanadium	6.9 35.9 35.6 8.8 7.3	Ingestion	39.6 0.4 60.0
				Inhalation				Inhalation	
				Dermal External Exposure				Dermal	
Future Teen Recreational User - surface	6.82E-06	Arsenic	95.3	Ingestion Inhalation Dermal External Exposure	<1	Nickel	53.8	Ingestion Inhalation Dermal	2.5 0.2 97.4

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.24. Summary of Risk Characterization for SWMU 194, EU 17

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.58E-05	Arsenic Chromium Total PAH	73.3 9.7 17.0	Ingestion Inhalation Dermal External Exposure	20.4 9.9 69.7	<1	*no COCs			
Outdoor Worker - surface	3.22E-05	Arsenic Chromium Total PAH	86.3 3.5 10.1	Ingestion Inhalation Dermal External Exposure	71.1 3.6 25.3	<1	Arsenic	94.8	Ingestion Inhalation Dermal	75.1 0.4 24.5
Outdoor Worker - subsurface	3.26E-05	Arsenic Cesium-137 Chromium Total PAH	82.5 6.7 4.1 6.6	Ingestion Inhalation Dermal External Exposure	66.7 4.2 22.4 6.7	<1	Arsenic Nickel	54.5 42.5	Ingestion Inhalation Dermal	46.9 0.4 52.6

Table D6.24. Summary of Risk Characterization for SWMU 194, EU 17 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.02E-05	Arsenic	81.5	Ingestion	48.1	<1	Arsenic	90.9	Ingestion	34.3
		Chromium	5.0	Inhalation	5.0				Inhalation	0.6
		Total PAH	13.6	Derma External Exposure	46.9				Derma	65.1
Future Child Resident - surface	6.02E-05	Arsenic	81.5	Ingestion	48.1	<1	Arsenic	94.1	Ingestion	67.8
		Chromium	5.0	Inhalation	5.0				Inhalation	0.6
		Total PAH	13.6	Derma External Exposure	46.9				Derma	31.6
Future Teen Recreational User - surface	8.56E-06	Arsenic	76.1	Ingestion	6.9	<1	*no COCs			
		Total PAH	20.6	Inhalation	3.3					
				Derma External Exposure	89.8					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.25. Summary of Risk Characterization for SWMU 194, EU 18

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.29E-05	Arsenic Chromium	82.3	Ingestion	21.5	<1	Nickel	59.5	Ingestion	8.3
			17.6	Inhalation	17.8			Inhalation	0.7	
				Dermal External Exposure	60.7			Dermal	91.0	
Outdoor Worker - surface	2.72E-05	Arsenic Chromium	93.8	Ingestion	72.5	<1	Arsenic Nickel	55.2	Ingestion	46.5
			6.2	Inhalation	6.3			Inhalation	0.4	
				Dermal External Exposure	21.3			Dermal	53.1	
Outdoor Worker - subsurface	3.03E-05	Arsenic Chromium	94.4	Ingestion	73.0	<1	Arsenic Iron Nickel	24.0	Ingestion	51.6
			5.5	Inhalation	5.6			Inhalation	2.3	
				Dermal External Exposure	21.4			Dermal	46.1	

Table D6.25. Summary of Risk Characterization for SWMU 194, EU 18 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	4.93E-05	Arsenic Chromium	91.0 8.9	Ingestion	1.30	Arsenic Nickel	32.5 56.9	Ingestion	37.8	
				Inhalation				Inhalation		0.4
				Dermal External Exposure				Dermal		86.6
Future Child Resident - surface	4.93E-05	Arsenic Chromium	91.0 8.9	Ingestion	1.30	Arsenic Nickel	49.3 42.8	Ingestion	0.5	
				Inhalation				Inhalation		0.5
				Dermal External Exposure				Dermal		61.7
Future Teen Recreational User - surface	6.38E-06	Arsenic	93.5	Ingestion	<1	Nickel	63.0	Ingestion	2.3	
				Inhalation				Inhalation		0.2
				Dermal External Exposure				Dermal		97.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.26. Summary of Risk Characterization for SWMU 194, EU 19

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.23E-05	Arsenic Chromium	87.0	Ingestion	22.7	<1	Nickel	65.1	Ingestion	9.0
			13.0	Inhalation	13.2			Inhalation	0.7	
				Dermal External Exposure	64.1			Dermal	90.3	
Outdoor Worker - surface	2.70E-05	Arsenic Chromium	95.6	Ingestion	73.8	<1	Arsenic Nickel	58.4	Ingestion	48.7
			4.4	Inhalation	4.5			Inhalation	0.4	
				Dermal External Exposure	21.7			Dermal	50.9	
Outdoor Worker - subsurface	2.52E-05	Arsenic Chromium	95.3	Ingestion	73.6	<1	Arsenic Nickel	42.4	Ingestion	37.9
			4.7	Inhalation	4.8			Inhalation	0.3	
				Dermal External Exposure	21.6			Dermal	61.8	

Table D6.26. Summary of Risk Characterization for SWMU 194, EU 19 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.85E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.7	<1	Arsenic Nickel	35.4 62.0	Ingestion	14.1
				Inhalation	6.5				Inhalation	0.4
				Dermal External Exposure	41.8				Dermal	85.5
Future Child Resident - surface	4.85E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.7	1.24	Arsenic Nickel	52.6 45.5	Ingestion	39.9
				Inhalation	6.5				Inhalation	0.5
				Dermal External Exposure	41.8				Dermal	59.6
Future Teen Recreational User - surface	6.32E-06	Arsenic	95.4	Ingestion	8.1	<1	Nickel	69.3	Ingestion	2.5
				Inhalation	4.7				Inhalation	0.2
				Dermal External Exposure	87.2				Dermal	97.3

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.27. Summary of Risk Characterization for SWMU 194, EU 20

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.42E-05	Arsenic Chromium	83.5 12.2	Ingestion	22.1	1.54	Cobalt Mercury Nickel Silver	13.0	Ingestion	5.3
				Inhalation	12.9			52.6	Inhalation	3.7
				Dermal	65.0			10.0	Dermal	91.0
				External Exposure				7.4		
Outdoor Worker - surface	3.05E-05	Arsenic Chromium	93.5 4.2	Ingestion	73.2	1.66	Arsenic Cobalt Manganese Mercury Nickel	10.8	Ingestion	34.8
				Inhalation	4.5			22.2	Inhalation	2.5
				Dermal	22.4			7.0	Dermal	62.6
				External Exposure				40.7		
								7.5		
Outdoor Worker - subsurface	2.98E-05	Arsenic Chromium	92.6 5.9	Ingestion	72.1	1.51	Arsenic Cobalt Manganese Mercury Nickel	11.4	Ingestion	32.7
				Inhalation	6.1			17.1	Inhalation	2.8
				Dermal	21.8			7.8	Dermal	64.6
				External Exposure				44.6		
								8.2		

Table D6.27. Summary of Risk Characterization for SWMU 194, EU 20 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	44.6	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	5.54E-05	Arsenic	90.8	Ingestion	2.66	Arsenic	5.5	Ingestion	8.6	
		Chromium	6.1	Inhalation		14.1	Cobalt	14.1	Inhalation	2.0
		Total PAH	2.9	Dermal		42.7	Manganese	4.5	Dermal	89.4
				External Exposure		Mercury	52.1			
						Nickel	9.8			
						Silver	7.3			
Future Child Resident - surface	5.54E-05	Arsenic	90.8	Ingestion	7.82	Arsenic	9.2	Ingestion	27.1	
		Chromium	6.1	Inhalation		6.4	Barium	3.0	Inhalation	3.2
		Total PAH	2.9	Dermal		42.7	Beryllium	1.4	Dermal	69.7
				External Exposure		Cobalt	19.8			
						Manganese	7.0			
						Mercury	43.6			
						Nickel	8.1			
						Silver	6.0			
						Vanadium	1.7			
Future Teen Recreational User - surface	7.36E-06	Arsenic	90.8	Ingestion	2.09	Cobalt	11.9	Ingestion	1.5	
				Inhalation		4.6	Mercury	55.7	Inhalation	1.0
				Dermal		87.7	Nickel	10.6	Dermal	97.5
				External Exposure		Silver	7.8			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.28. Summary of Risk Characterization for SWMU 194, EU 21

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs			<1		*no COCs			
Future Industrial Worker - surface	1.83E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	Mercury Nickel	76.2 17.0	Ingestion Inhalation Dermal	1.8 0.1 98.1
Outdoor Worker - surface	1.36E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	Mercury Nickel	74.2 16.0	Ingestion Inhalation Dermal	15.1 0.1 84.8
Outdoor Worker - subsurface	8.64E-05	Arsenic Chromium	98.2 1.6	Ingestion Inhalation Dermal External Exposure	75.8 1.9 22.3	5.31	Arsenic Barium Cobalt Iron Manganese Mercury Nickel	10.0 7.8 27.2 6.6 29.8 11.6 2.5	Ingestion Inhalation Dermal	49.9 9.9 40.1

Table D6.28. Summary of Risk Characterization for SWMU 194, EU 21 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.08E-06	Arsenic	98.2	See Outdoor Worker (subsurface)	1.66	Arsenic Barium Cobalt Iron Manganese Mercury	10.0 7.8 27.2 6.6 29.8 11.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.56E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	1.66	Mercury Nickel	76.1 16.9	Ingestion Inhalation Dermal	3.0 0.0 97.0
Future Child Resident - surface	3.56E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	4.15	Antimony Mercury Nickel Thallium	4.1 74.8 16.3 4.2	Ingestion Inhalation Dermal	11.1 0.1 88.8
Future Teen Recreational User - surface	<1E-6	*no COCs			1.38	Mercury Nickel	76.5 17.0	Ingestion Inhalation Dermal	0.5 0.0 99.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario. Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.29. Summary of Risk Characterization for SWMU 194, EU 22

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.35E-06	PCB, Total	97.3	Ingestion	6.4	<1	*no COCs			
				Inhalation	9.7					
				Dermal External Exposure	84.0					
Future Industrial Worker - surface	5.98E-05	Chromium PCB, Total	2.7 97.3	Ingestion	6.4	<1	*no COCs			
				Inhalation	9.7					
				Dermal External Exposure	84.0					
Outdoor Worker - surface	6.85E-05	Chromium PCB, Total	1.8 98.2	Ingestion	39.6	<1	*no COCs			
				Inhalation	6.2					
				Dermal External Exposure	54.2					
Outdoor Worker - subsurface	9.45E-05	Arsenic Cesium-137 Chromium PCB, Total	29.3 1.5 1.2 67.9	Ingestion	50.0	<1	Arsenic Cobalt Nickel	24.1 26.1 18.6	Ingestion	48.6
				Inhalation	4.4				Inhalation	3.1
				Dermal	44.1				Dermal	48.3
				External Exposure	1.5					

Table D6.29. Summary of Risk Characterization for SWMU 194, EU 22 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.18E-06			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.74E-04	Chromium PCB, Total	1.8 98.2	Ingestion Inhalation Dermal External Exposure	19.6 6.5 73.9	<1	*no COCs			
Future Child Resident - surface	1.74E-04	Chromium PCB, Total	1.8 98.2	Ingestion Inhalation Dermal External Exposure	19.6 6.5 73.9	<1	Manganese	89.5	Ingestion Inhalation Dermal	34.5 36.1 29.5
Future Teen Recreational User - surface	3.68E-05	PCB, Total	99.2	Ingestion Inhalation Dermal External Exposure	1.9 2.9 95.2	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.30. Summary of Risk Characterization for SWMU 194, EU 23

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.38E-05	Arsenic Chromium	84.1	Ingestion	22.0	<1	Nickel Silver	44.1	Ingestion	7.5
			15.9	Inhalation	16.1			22.9	Inhalation	0.4
				Dermal External Exposure	62.0				Dermal	92.1
Outdoor Worker - surface	2.95E-05	Arsenic Chromium	94.5	Ingestion	73.0	<1	Arsenic Iron Nickel	30.7	Ingestion	43.8
			5.5	Inhalation	5.6			23.9	Inhalation	0.3
				Dermal External Exposure	21.4				Dermal	56.0
Outdoor Worker - subsurface	3.10E-05	Arsenic Cesium-137 Chromium	87.4	Ingestion	67.6	1.32	Arsenic Iron Mercury Nickel	12.8	Ingestion	28.6
			7.9	Inhalation	4.7			10.8	Inhalation	1.0
			4.7	Dermal	19.8			54.4	Dermal	70.4
				External Exposure	7.8			10.5		

Table D6.30. Summary of Risk Characterization for SWMU 194, EU 23 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	54.4	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	5.33E-05	Arsenic Chromium	92.0 8.0	Ingestion	2.59	Arsenic Iron Nickel Silver	17.4 16.7 42.3 22.1	Ingestion	11.8	
				Inhalation				Inhalation		0.2
				Dermal External Exposure				Dermal		88.0
Future Child Resident - surface	5.33E-05	Arsenic Chromium	92.0 8.0	Ingestion	2.59	Arsenic Iron Nickel Silver	27.2 21.9 32.7 17.0	Ingestion	35.3	
				Inhalation				Inhalation		0.3
				Dermal External Exposure				Dermal		64.4
Future Teen Recreational User - surface	6.92E-06	Arsenic	94.2	Ingestion	<1	Nickel Silver	46.2 24.2	Ingestion	2.1	
				Inhalation				Inhalation		0.1
				Dermal External Exposure				Dermal		97.8

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.31. Summary of Risk Characterization for SWMU 194, EU 24

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs			<1		*no COCs			
Future Industrial Worker - surface	2.06E-06	Chromium	80.9	Ingestion	1.4	<1	Nickel	96.5	Ingestion	1.0
				Inhalation	81.3				Inhalation	0.5
				Dermal External Exposure	17.3				Dermal	98.5
Outdoor Worker - surface	1.71E-06	Chromium	72.1	Ingestion	12.1	<1	Nickel	96.7	Ingestion	9.0
				Inhalation	72.5				Inhalation	0.5
				Dermal External Exposure	15.4				Dermal	90.5
Outdoor Worker - subsurface	3.20E-05	Arsenic Cesium-137 Chromium	89.7 5.8 3.6	Ingestion	69.8	1.21	Arsenic Iron Mercury Nickel	14.9 14.2 54.0 13.1	Ingestion	30.2
				Inhalation	3.6				Inhalation	0.9
				Dermal	20.9				Dermal	68.8
				External Exposure	5.7					

Table D6.31. Summary of Risk Characterization for SWMU 194, EU 24 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	54.0	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.42E-06	Chromium Total PAH	73.1 26.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.5	Ingestion Inhalation Dermal	1.7 0.3 98.0
Future Child Resident - surface	4.42E-06	Chromium Total PAH	73.1 26.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.7	Ingestion Inhalation Dermal	6.5 0.5 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	96.5	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.32. Summary of Risk Characterization for SWMU 194, EU 25

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1				
Future Industrial Worker - surface	2.38E-06	Chromium	85.1	Ingestion	1.1	<1	Nickel	60.5	Ingestion	2.4
				Inhalation	85.4				Inhalation	9.6
				Dermal External Exposure	13.5				Dermal	88.1
Outdoor Worker - surface	1.93E-06	Chromium	77.8	Ingestion	9.7	<1	Nickel	54.8	Ingestion	18.9
				Inhalation	78.0				Inhalation	8.0
				Dermal External Exposure	12.3				Dermal	73.2
Outdoor Worker - subsurface	2.70E-05	Arsenic Chromium	93.7 4.7	Ingestion	73.1	<1	Arsenic Nickel	33.8 25.5	Ingestion	45.9
				Inhalation	4.8				Inhalation	4.3
				Dermal External Exposure	22.1				Dermal	49.8

Table D6.32. Summary of Risk Characterization for SWMU 194, EU 25 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.01E-06	Chromium Total PAH	78.6 21.1	Ingestion Inhalation Dermal External Exposure	4.7 78.9 16.4	<1	Nickel	62.5	Ingestion Inhalation Dermal	4.0 5.4 90.6
Future Child Resident - surface	5.01E-06	Chromium Total PAH	78.6 21.1	Ingestion Inhalation Dermal External Exposure	4.7 78.9 16.4	1.09	Barium Manganese Nickel	19.6 21.8 56.0	Ingestion Inhalation Dermal	13.9 9.3 76.8
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	Nickel	65.6	Ingestion Inhalation Dermal	0.7 2.7 96.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.33. Summary of Risk Characterization for SWMU 194, EU 26

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.39E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.03E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.31E-05	Arsenic Chromium	94.7 5.1	Ingestion Inhalation Dermal External Exposure	73.2 5.3 21.5	<1	Arsenic Cobalt	22.2 38.0	Ingestion Inhalation Dermal	59.7 2.4 38.0

Table D6.33. Summary of Risk Characterization for SWMU 194, EU 26 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.69E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Silver	72.5	Ingestion Inhalation Dermal	4.4 0.0 95.5
Future Child Resident - surface	2.69E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Silver Thallium	67.1 18.1	Ingestion Inhalation Dermal	15.9 0.0 84.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Silver	74.2	Ingestion Inhalation Dermal	0.7 0.0 99.3

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.34. Summary of Risk Characterization for SWMU 194, EU 27

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	1.74E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	60.4	Ingestion	1.0	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		98.7
Outdoor Worker - surface	1.28E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	60.5	Ingestion	9.1	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		90.6
Outdoor Worker - subsurface	2.69E-05	Arsenic Chromium	95.3 4.7	Ingestion	73.6	<1	Arsenic Nickel	41.7 32.2	Ingestion	38.1	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		61.6

Table D6.34. Summary of Risk Characterization for SWMU 194, EU 27 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.37E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	60.4 37.2	Ingestion Inhalation Dermal	1.7 0.2 98.1
Future Child Resident - surface	3.37E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	1.04	Nickel Silver	60.5 37.2	Ingestion Inhalation Dermal	6.5 0.3 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	60.3 37.2	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.35. Summary of Risk Characterization for SWMU 194, EU 28

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.41E-05	Arsenic Chromium	85.7	Ingestion	22.4	<1	Nickel Silver	38.6	Ingestion	7.3
			14.3	Inhalation	14.5			23.9	Inhalation	6.4
				Dermal External Exposure	63.1				Dermal	86.3
Outdoor Worker - surface	3.05E-05	Arsenic Chromium	95.1	Ingestion	73.5	<1	Arsenic Nickel	35.8	Ingestion	42.9
			4.9	Inhalation	5.0			25.9	Inhalation	3.9
				Dermal External Exposure	21.6				Dermal	53.1
Outdoor Worker - subsurface	2.88E-05	Arsenic Chromium	94.6	Ingestion	73.0	<1	Arsenic Nickel Silver	32.1	Ingestion	40.0
			5.4	Inhalation	5.5			24.6	Inhalation	4.0
				Dermal External Exposure	21.5				Dermal	56.0

Table D6.35. Summary of Risk Characterization for SWMU 194, EU 28 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.50E-05	Arsenic Chromium	92.9 7.1	Ingestion	2.33	Arsenic Manganese Nickel Silver Vanadium	31.5 11.7 28.8 17.8 6.1	Ingestion	11.8 3.5 84.8
				Inhalation				Inhalation	
				Dermal External Exposure				Dermal	
Future Child Resident - surface	5.50E-05	Arsenic Chromium	92.9 7.1	Ingestion	2.33	Arsenic Manganese Nickel Silver Vanadium	31.5 11.7 28.8 17.8 6.1	Ingestion	11.8 3.5 84.8
				Inhalation				Inhalation	
				Dermal External Exposure				Dermal	
Future Teen Recreational User - surface	7.16E-06	Arsenic	94.9	Ingestion	<1	Nickel Silver	42.5 26.4	Ingestion	2.1 1.9 96.0
				Inhalation				Inhalation	
				Dermal External Exposure				Dermal	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.36. Summary of Risk Characterization for SWMU 194, EU 29

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	1.68E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	54.9	Ingestion	1.2	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.24E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	54.1	Ingestion	10.8	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		89.0
Outdoor Worker - subsurface	3.59E-05	Arsenic Chromium	95.9 3.9	Ingestion	74.1	1.04	Arsenic Cobalt Manganese Nickel	20.7	Ingestion	50.3	
				Inhalation					Inhalation		4.8
				Dermal External Exposure					Dermal		45.0

Table D6.36. Summary of Risk Characterization for SWMU 194, EU 29 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.26E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	54.8 32.8	Ingestion Inhalation Dermal	2.0 0.2 97.8
Future Child Resident - surface	3.26E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	1.15	Antimony Nickel Silver	11.1 54.4 32.5	Ingestion Inhalation Dermal	7.8 0.3 91.9
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	54.9 32.9	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.37. Summary of Risk Characterization for SWMU 194, EU 30

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.88E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	1.24	Mercury Nickel	79.0 13.2	Ingestion Inhalation Dermal	1.4 0.1 98.6
Outdoor Worker - surface	1.39E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	1.02	Mercury Nickel	79.5 12.8	Ingestion Inhalation Dermal	11.8 0.1 88.1
Outdoor Worker - subsurface	2.42E-05	Arsenic Chromium	94.2 5.8	Ingestion Inhalation Dermal External Exposure	72.8 5.9 21.4	1.29	Arsenic Mercury Nickel	11.0 63.3 10.2	Ingestion Inhalation Dermal	21.1 0.9 78.1

Table D6.37. Summary of Risk Characterization for SWMU 194, EU 30 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	63.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.65E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	2.12	Mercury Nickel Silver	79.0 13.1 7.3	Ingestion Inhalation Dermal	2.2 0.0 97.7
Future Child Resident - surface	3.65E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	5.20	Mercury Nickel Silver	79.3 13.0 7.2	Ingestion Inhalation Dermal	8.6 0.1 91.4
Future Teen Recreational User - surface	<1E-6	*no COCs			1.78	Mercury Nickel Silver	78.9 13.2 7.3	Ingestion Inhalation Dermal	0.4 0.0 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.38. Summary of Risk Characterization for SWMU 194, EU 31

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs								
Future Industrial Worker - surface	7.63E-06	Cesium-137 Uranium-238	86.7	Ingestion	1.6					
			13.3	Inhalation	0.0					
				Dermal External Exposure	98.4					
Outdoor Worker - surface	6.41E-06	Cesium-137 Uranium-238	77.1	Ingestion	13.4					
			22.9	Inhalation	0.0					
				Dermal External Exposure	86.6					
Outdoor Worker - subsurface	6.41E-06	Cesium-137 Uranium-238	77.1	Ingestion	13.4					
			22.9	Inhalation	0.0					
				Dermal External Exposure	86.6					

Table D6.38. Summary of Risk Characterization for SWMU 194, EU 31 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)					See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.83E-05	Cesium-137 Uranium-238	87.0 13.0	Ingestion Inhalation Dermal External Exposure	1.3 0.0 98.7		*no COCs			
Future Child Resident - surface	3.83E-05	Cesium-137 Uranium-238	87.0 13.0	Ingestion Inhalation Dermal External Exposure	1.3 0.0 98.7		*no COCs			
Future Teen Recreational User - surface	1.59E-06	Cesium-137	87.4	Ingestion Inhalation Dermal External Exposure	0.8 0.0 99.1		*no COCs			

There are no subsurface data available for assessment.

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.39. Summary of Risk Characterization for SWMU 196, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs			<1		*no COCs			
Future Industrial Worker - surface	2.76E-06	Neptunium-237	41.6	Ingestion	4.2	1.35	Nickel	96.5	Ingestion	1.3
				Inhalation	25.8				Inhalation	0.5
				Dermal	70.0				Dermal	98.1
Outdoor Worker - surface	2.79E-06	Uranium-238	47.2	Ingestion	29.8	1.11	Nickel	94.3	Ingestion	11.6
				Inhalation	18.9				Inhalation	0.5
				Dermal	51.3				Dermal	88.0
Outdoor Worker - subsurface	3.08E-05	Arsenic Chromium Uranium-238	82.2 8.9 4.3	Ingestion	66.2	18.84	Antimony Arsenic Beryllium Cadmium Cobalt Iron Manganese Nickel Silver Thallium	23.8 0.8 11.3 3.0 10.3 1.2 0.5 5.9 2.6 39.1	Ingestion	45.2
				Inhalation	10.5				Inhalation	0.4
				Dermal	18.6				Dermal	54.5
				External Exposure	4.6					

Table D6.39. Summary of Risk Characterization for SWMU 196, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	5.89	Antimony Beryllium Cadmium Cobalt Nickel Silver Thallium	23.8 11.3 3.0 10.3 5.9 2.6 39.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.16E-05	Chromium Neptunium-237 Uranium-238	10.9 49.7 38.4	Ingestion Inhalation Dermal External Exposure	2.30	Nickel	96.3	Ingestion Inhalation Dermal	2.2 0.3 97.5
Future Child Resident - surface	1.16E-05	Chromium Neptunium-237 Uranium-238	10.9 49.7 38.4	Ingestion Inhalation Dermal External Exposure	5.65	Antimony Nickel Uranium	1.9 94.9 3.0	Ingestion Inhalation Dermal	8.4 0.5 91.1
Future Teen Recreational User - surface	<1E-6	*no COCs			1.93	Nickel	96.7	Ingestion Inhalation Dermal	0.4 0.1 99.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.40. Summary of Risk Characterization for SWMU 196, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.21E-06	*no COCs				<1		*no COCs		
Future Industrial Worker - surface	2.15E-05	PCB, Total Total PAH Uranium-238	37.4	Ingestion	7.2	<1	Nickel	80.1	Ingestion	1.6
			53.4	Inhalation	6.0				Inhalation	0.8
			6.0	Dermal External Exposure	81.5 5.3				Dermal	97.6
Outdoor Worker - surface	2.57E-05	PCB, Total Total PAH Uranium-238	36.2	Ingestion	42.5	<1	Nickel	76.5	Ingestion	13.9
			54.5	Inhalation	3.7				Inhalation	0.7
			7.3	Dermal External Exposure	50.5 3.3				Dermal	85.5
Outdoor Worker - subsurface	2.20E-04	Arsenic PCB, Total Total PAH Uranium-238	10.3	Ingestion	47.3	2.80	Antimony Arsenic Nickel	82.2	Ingestion	28.0
			4.2	Inhalation	0.3				Inhalation	0.2
			84.6	Dermal External Exposure	52.0 0.4				Dermal	71.8

Table D6.40. Summary of Risk Characterization for SWMU 196, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.75E-06	Total PAH	84.6	See Outdoor Worker (subsurface)	<1	<1	Antimony	82.2	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.64E-05	Chromium	2.0	Ingestion	19.7	<1	Nickel	79.9	Ingestion	2.7
		PCB, Total	35.6	Inhalation	3.8				Inhalation	0.4
		Total PAH	52.7	Dermal	67.8				Dermal	96.9
		Uranium-238	9.6	External Exposure	8.7					
Future Child Resident - surface	6.64E-05	Chromium	2.0	Ingestion	19.7	<1	Barium Nickel	15.7 77.6	Ingestion	10.1
		PCB, Total	35.6	Inhalation	3.8				Inhalation	0.8
		Total PAH	52.7	Dermal	67.8				Dermal	89.1
		Uranium-238	9.6	External Exposure	8.7					
Future Teen Recreational User - surface	1.30E-05	PCB, Total	38.9	Ingestion	2.1	<1	Nickel	80.6	Ingestion	0.4
		Total PAH	58.2	Inhalation	1.8				Inhalation	0.2
				Dermal	94.2				Dermal	99.4
				External Exposure	1.9					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.41. Summary of Risk Characterization for SWMU 489

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.64E-06	Chromium Total PAH	37.9 38.1	Ingestion	5.5	<1	Nickel	97.4	Ingestion	1.0
				Inhalation	38.3				Inhalation	0.5
				Dermal External Exposure	35.2 21.0				Dermal	98.5
Outdoor Worker - surface	3.97E-06	Chromium Total PAH Uranium-238	25.7 42.6 31.5	Ingestion	36.0	<1	Nickel	97.6	Ingestion	9.1
				Inhalation	25.9				Inhalation	0.5
				Dermal	23.8				Dermal	90.5
				External Exposure	14.2					
Outdoor Worker - subsurface	2.71E-05	Arsenic Total PAH Uranium-238	89.1 6.3 4.6	Ingestion	74.1	<1	Arsenic Nickel	49.6 49.0	Ingestion	43.7
				Inhalation	0.1				Inhalation	0.4
				Dermal	23.7				Dermal	55.8
				External Exposure	2.1					

Table D6.41. Summary of Risk Characterization for SWMU 489 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.12E-05	Chromium	24.0	Ingestion	<1	Nickel	97.4	Ingestion	97.4
		Total PAH	37.9	Inhalation				Inhalation	
		Uranium-238	38.0	Derma				Derma	
Future Child Resident - surface	1.12E-05	Chromium	24.0	Ingestion	<1	Nickel	97.5	Ingestion	97.5
		Total PAH	37.9	Inhalation				Inhalation	
		Uranium-238	38.0	Derma				Derma	
Future Teen Recreational User - surface	1.34E-06	*no COCs		External Exposure	<1	Nickel	97.4	Ingestion	97.4
								Inhalation	
								Derma	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.42. Summary of Risk Characterization for SWMU 531

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.91E-06	Arsenic	90.4	Ingestion	24.2	<1	*no COCs			
				Inhalation	3.4					
				Dermal	68.2					
				External Exposure	4.1					
Future Industrial Worker - surface	5.19E-05	Arsenic Chromium Uranium-238	90.4	Ingestion	24.2	<1	Arsenic Iron Nickel	29.5 22.7 37.9	Ingestion	13.1
				Inhalation	3.4				Inhalation	0.6
				Dermal	68.2				Dermal	86.3
				External Exposure	4.1					
Outdoor Worker - surface	1.18E-04	Arsenic Chromium Total PAH Uranium-238	95.3	Ingestion	75.4	1.57	Arsenic Iron Nickel	44.8 26.8 19.5	Ingestion	59.1
				Inhalation	1.1				Inhalation	0.3
				Dermal	22.1				Dermal	40.6
				External Exposure	1.3					
Outdoor Worker - subsurface	1.19E-04	Arsenic Chromium Total PAH Uranium-238	95.2	Ingestion	75.4	1.62	Arsenic Iron Nickel	43.6 26.0 18.9	Ingestion	58.8
				Inhalation	1.2				Inhalation	1.1
				Dermal	22.1				Dermal	40.0
				External Exposure	1.3					

Table D6.42. Summary of Risk Characterization for SWMU 531 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.48E-06	Arsenic	95.2	See Outdoor Worker (subsurface)	<1	Arsenic Iron	43.6 26.0	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.17E-04	Arsenic Chromium Total PAH Uranium-235 Uranium-238	91.8 1.5 1.3 0.8 4.6	Ingestion Inhalation Dermal External Exposure	1.84	Arsenic Iron Nickel	31.7 23.3 35.2	Ingestion Inhalation Dermal	19.9 0.3 79.8
Future Child Resident - surface	2.17E-04	Arsenic Chromium Total PAH Uranium-235 Uranium-238	91.8 1.5 1.3 0.8 4.6	Ingestion Inhalation Dermal External Exposure	6.80	Antimony Arsenic Iron Nickel Uranium Zinc	2.7 41.9 26.0 23.0 2.6 2.6	Ingestion Inhalation Dermal	50.3 0.4 49.4
Future Teen Recreational User - surface	2.78E-05	Arsenic	95.0	Ingestion Inhalation Dermal External Exposure	1.31	Arsenic Iron Nickel	26.3 21.9 41.7	Ingestion Inhalation Dermal	3.8 0.2 96.0

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.43. Summary of Risk Characterization for SWMU 200

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.42E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.54E-05	Cesium-137	26.3	Ingestion	4.7	1.10	Mercury	67.8	Ingestion	1.7
		Chromium	7.5	Inhalation	11.5		Nickel	27.2	Inhalation	0.2
		PCB, Total	54.6	Dermal	48.8				Dermal	98.1
		Uranium-238	8.3	External Exposure	35.0					
Outdoor Worker - surface	2.64E-05	Cesium-137	18.9	Ingestion	32.2	<1	Mercury	66.4	Ingestion	14.6
		Chromium	5.3	Inhalation	8.2		Nickel	25.8	Inhalation	0.1
		PCB, Total	60.8	Dermal	34.8				Dermal	85.3
		Uranium-238	11.6	External Exposure	24.9					
Outdoor Worker - subsurface	4.81E-05	Arsenic	48.8	Ingestion	54.3	1.18	Arsenic	12.4	Ingestion	22.5
		Cesium-137	8.4	Inhalation	4.7		Mercury	54.2	Inhalation	0.8
		Chromium	3.2	Dermal	29.9		Nickel	20.0	Dermal	76.7
		PCB, Total	33.3	External Exposure	11.0					
Uranium-238	5.0									

Table D6.43. Summary of Risk Characterization for SWMU 200 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.17E-05	Cesium-137	36.6	Ingestion	10.3	1.89	Mercury	54.2	Ingestion	2.9
		Chromium	4.0	Inhalation	6.2		Mercury	67.8	Inhalation	0.1
		PCB, Total	44.4	Dermal	34.7		Nickel	27.0	Dermal	97.1
		Total PAH	1.6	External Exposure	48.8					
		Uranium-235	2.0							
Uranium-238	11.3									
Future Child Resident - surface	9.17E-05	Cesium-137	36.6	Ingestion	10.3	4.71	Antimony	2.2	Ingestion	10.7
		Chromium	4.0	Inhalation	6.2		Mercury	66.8	Inhalation	0.2
		PCB, Total	44.4	Dermal	34.7		Nickel	26.2	Dermal	89.2
		Total PAH	1.6	External Exposure	48.8		Uranium	4.2		
		Uranium-235	2.0							
Uranium-238	11.3									
Future Teen Recreational User - surface	1.13E-05	Cesium-137	12.4	Ingestion	1.8	1.58	Mercury	68.1	Ingestion	0.5
		PCB, Total	77.3	Inhalation	4.7		Nickel	27.3	Inhalation	0.0
				Dermal	76.9				Dermal	99.5
				External Exposure	16.6					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.44. Summary of Risk Characterization for SWMU 212

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI									
Current Industrial Worker - surface	3.40E-06	Thorium-230	31.1	Ingestion	35.0	<1	*no COCs												
				Inhalation	4.7														
Future Industrial Worker - surface	6.07E-05	Arsenic Cesium-137 Chromium Neptunium-237 Thorium-230 Uranium-238	23.8 11.5 2.0 24.3 31.1 3.1	Dermal	18.9	<1	Iron Nickel	32.8 40.3	Ingestion Inhalation Dermal	11.6 0.4 87.9									
				External Exposure	41.4														
				Ingestion	35.0														
				Inhalation	4.7														
				Dermal	18.9														
Outdoor Worker - surface	1.80E-04	Arsenic Cesium-137 Neptunium-237 PCB, Total Plutonium-239/240 Thorium-230 Uranium-238	19.3 2.9 6.8 0.6 2.3 65.7 1.5	Ingestion	83.8	<1	Arsenic Iron Nickel	29.1 41.1 22.0	Ingestion Inhalation Dermal	55.8 0.2 44.0									
				Inhalation	1.2														
				Dermal	4.7														
				External Exposure	10.3														
				Outdoor Worker - subsurface	1.81E-04						Arsenic Cesium-137 Chromium Neptunium-237 PCB, Total Plutonium-239/240 Thorium-230 Uranium-238	19.2 2.9 0.9 6.7 0.6 2.3 65.4 1.5	Ingestion	83.4	2.01	Arsenic Cobalt Iron Mercury Nickel Silver	10.8 15.2 15.2 31.9 8.1 5.8	Ingestion Inhalation Dermal	39.7 1.4 58.9
													Inhalation	1.6					
													Dermal	4.7					
													External Exposure	10.3					
													External Exposure	10.3					

Table D6.44. Summary of Risk Characterization for SWMU 212 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.26E-06	Thorium-230	65.4	See Outdoor Worker (subsurface)	<1	<1	Mercury	31.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.65E-04	Arsenic	23.1	Ingestion	39.5	3.26	Arsenic	26.9	Ingestion	46.9
		Cesium-137	13.3	Inhalation	1.6		Iron	39.4	Inhalation	0.3
		Chromium	0.9	Dermal	11.1		Nickel	25.7	Dermal	52.8
		Cobalt-60	0.9	External Exposure	47.8		Uranium	5.1		
		Neptunium-237	28.0							
		PCB, Total	1.1							
		Plutonium-239/240	0.9							
		Thorium-230	27.4							
Uranium-235	1.0									
Uranium-238	3.5									
Future Child Resident - surface	2.65E-04	Arsenic	23.1	Ingestion	39.5	3.26	Arsenic	26.9	Ingestion	46.9
Future Teen Recreational User - surface	1.64E-05	Cesium-137	13.3	Inhalation	1.6		Iron	39.4	Inhalation	0.3
		Chromium	0.9	Dermal	11.1		Nickel	25.7	Dermal	52.8
		Cobalt-60	0.9	External Exposure	47.8		Uranium	5.1		
		Neptunium-237	28.0							
		PCB, Total	1.1							
		Plutonium-239/240	0.9							
		Thorium-230	27.4							
		Uranium-235	1.0							
Uranium-238	3.5									

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.45. Summary of Risk Characterization for SWMU 213, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs					
Future Industrial Worker - surface	6.25E-06	Chromium	25.3	Ingestion	6.4	<1	Nickel Silver	49.1	Ingestion	1.3		
		Total PAH	46.4	Inhalation	26.0			38.5	Inhalation	0.3		
		Uranium-238	21.9	Dermal	48.2				Dermal	98.5		
			19.4	External Exposure								
Outdoor Worker - surface	7.16E-06	Chromium	16.4	Ingestion	39.5	<1	Nickel	48.3	Ingestion	10.9		
		Total PAH	49.5	Inhalation	16.8						Inhalation	0.2
		Uranium-238	27.8	Dermal	31.2							
					12.5						External Exposure	
Outdoor Worker - subsurface	2.95E-05	Arsenic	75.2	Ingestion	67.7	<1	Arsenic Nickel	31.1	Ingestion	35.3		
		Chromium	4.5	Inhalation	4.7						Inhalation	3.6
		Total PAH	12.0	Dermal	24.6							
		Uranium-238	6.7	External Exposure	3.0							

Table D6.45. Summary of Risk Characterization for SWMU 213, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.98E-05	Chromium PCB, Total Total PAH Uranium-238	15.5 5.8 44.6 34.0	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	49.0 38.5	Ingestion Inhalation Dermal	2.1 0.1 97.8
Future Child Resident - surface	1.98E-05	Chromium PCB, Total Total PAH Uranium-238	15.5 5.8 44.6 34.0	Ingestion Inhalation Dermal External Exposure	1.32	Antimony Nickel Silver	11.6 48.6 38.1	Ingestion Inhalation Dermal	7.8 0.3 91.9
Future Teen Recreational User - surface	2.72E-06	Total PAH	70.3	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	49.1 38.7	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.46. Summary of Risk Characterization for SWMU 213, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1				
Future Industrial Worker - surface	1.49E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	100.0	<1	Nickel Silver	65.9 32.5	Ingestion Inhalation Dermal	1.0 0.3 98.6
Outdoor Worker - surface	1.11E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	100.0	<1	Nickel	66.0	Ingestion Inhalation Dermal	9.1 0.3 90.5
Outdoor Worker - subsurface	1.67E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	Manganese Nickel	29.0 46.5	Ingestion Inhalation Dermal	20.6 9.5 69.9

Table D6.46. Summary of Risk Characterization for SWMU 213, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.90E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	65.9 32.5	Ingestion Inhalation Dermal	1.7 0.2 98.1
Future Child Resident - surface	2.90E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	1.33	Nickel Silver	66.0 32.5	Ingestion Inhalation Dermal	6.6 0.4 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	65.8 32.5	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.47. Summary of Risk Characterization for SWMU 214

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.78E-05	Arsenic	100.0	Ingestion Inhalation Dermal External Exposure	77.3 0.1 22.7	<1	Arsenic	89.1	Ingestion Inhalation Dermal	71.2 0.3 28.5

Table D6.47. Summary of Risk Characterization for SWMU 214 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	<1E-6	*no COCs			<1	*no COCs			
Future Child Resident - surface	<1E-6	*no COCs			<1	Antimony	100.0	Ingestion Inhalation Dermal	17.6 82.4
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

There are no subsurface data available for assessment.

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.48. Summary of Risk Characterization for SWMU 215

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.27E-06	Chromium Total PAH	58.0 41.7	Ingestion	3.2	<1	Iron Nickel	43.0	Ingestion	8.3
				Inhalation	58.3			47.6	Inhalation	0.3
				Dermal External Exposure	38.5				Dermal	91.5
Outdoor Worker - surface	3.08E-06	Chromium Total PAH	45.7 54.2	Ingestion	23.8	<1	Iron Nickel	63.0	Ingestion	46.4
				Inhalation	45.9			30.3	Inhalation	0.1
				Dermal External Exposure	30.3				Dermal	53.4
Outdoor Worker - subsurface	3.62E-05	Arsenic Chromium Total PAH	67.6 3.9 28.5	Ingestion	64.8	<1	Arsenic Iron Nickel	22.5	Ingestion	49.4
				Inhalation	4.0			42.2	Inhalation	0.2
				Dermal External Exposure	31.3			20.3	Dermal	50.4

Table D6.48. Summary of Risk Characterization for SWMU 215 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.86E-06	Chromium Total PAH	46.9 52.9	Ingestion Inhalation Dermal External Exposure	<1	Iron Nickel	45.5 45.5	Ingestion Inhalation Dermal	13.0 0.1 86.9
Future Child Resident - surface	7.86E-06	Chromium Total PAH	46.9 52.9	Ingestion Inhalation Dermal External Exposure	2.06	Antimony Iron Nickel	6.0 58.4 34.3	Ingestion Inhalation Dermal	37.7 0.2 62.1
Future Teen Recreational User - surface	1.25E-06	*no COCs			<1	Iron Nickel	39.9 50.3	Ingestion Inhalation Dermal	2.3 0.1 97.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.49. Summary of Risk Characterization for SWMU 216

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.09E-06	Total PAH	61.6	Ingestion Inhalation Dermal External Exposure	6.8 19.4 56.9 16.9	<1	*no COCs			
Outdoor Worker - surface	4.80E-06	Total PAH Uranium-238	64.2 23.6	Ingestion Inhalation Dermal External Exposure	41.1 12.3 35.9 10.7	<1	*no COCs			
Outdoor Worker - subsurface	2.85E-05	Arsenic Cesium-137 Total PAH Uranium-238	72.7 12.5 10.8 4.0	Ingestion Inhalation Dermal External Exposure	63.3 0.1 22.5 14.1	<1	Arsenic	100.0	Ingestion Inhalation Dermal	77.0 0.4 22.6

Table D6.49. Summary of Risk Characterization for SWMU 216 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.31E-05	Chromium	11.7	Ingestion	15.8	<1	*no COCs			
		Total PAH	58.8	Inhalation	11.8					
		Uranium-238	29.4	Dermal	45.7					
Future Child Resident - surface	1.31E-05	Chromium	11.7	Ingestion	15.8	<1	*no COCs			
		Total PAH	58.8	Inhalation	11.8					
		Uranium-238	29.4	Dermal	45.7					
Future Teen Recreational User - surface	1.96E-06	Total PAH	84.7	Ingestion	2.3	<1	*no COCs			
				Inhalation	7.4					
				Dermal	82.9					
				External Exposure	7.4					

There are no subsurface data available for assessment.

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.50. Summary of Risk Characterization for SWMU 217, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.60E-06	Chromium	79.0	Ingestion	2.1	<1	Cobalt Nickel Silver	33.7	Ingestion	6.9
				Inhalation	81.2			36.3	Inhalation	3.9
				Dermal				22.7	Dermal	89.1
Outdoor Worker - surface	3.15E-06	Chromium	66.9	Ingestion	17.1	<1	Cobalt Nickel Silver	52.4	Ingestion	41.6
				Inhalation	68.8			24.8	Inhalation	2.5
				Dermal				15.5	Dermal	55.9
Outdoor Worker - subsurface	2.53E-05	Arsenic Chromium	89.8 6.3	Ingestion	71.4	1.46	Arsenic Cobalt Mercury Nickel Silver	9.7	Ingestion	31.2
				Inhalation	6.6			19.6	Inhalation	1.4
				Dermal	20.4			46.8	Dermal	67.4
				External Exposure	1.7					

Table D6.50. Summary of Risk Characterization for SWMU 217, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	46.8	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.00E-06	Chromium Uranium-238	61.3 37.1	Ingestion Inhalation Dermal External Exposure	<1	Cobalt Nickel Silver	36.2 35.5 22.3	Ingestion Inhalation Dermal	11.1 2.1 86.8
Future Child Resident - surface	9.00E-06	Chromium Uranium-238	61.3 37.1	Ingestion Inhalation Dermal External Exposure	3.00	Cobalt Manganese Nickel Silver	47.8 6.1 27.5 17.2	Ingestion Inhalation Dermal	33.2 3.1 63.7
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Cobalt Nickel Silver	31.5 39.0 24.5	Ingestion Inhalation Dermal	2.0 1.1 96.9

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.51. Summary of Risk Characterization for SWMU 217, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.30E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.32E-05	Arsenic	48.3	Ingestion	15.4	1.80	Cobalt	9.2	Ingestion	5.1
		Chromium	14.5	Inhalation	15.0		Iron	6.8	Inhalation	1.3
		Total PAH	36.8	Dermal	69.6		Mercury	53.0	Dermal	93.6
				External Exposure			Nickel	12.6		
							Silver	8.3		
Outdoor Worker - surface	3.99E-05	Arsenic	67.5	Ingestion	63.6	1.91	Arsenic	8.8	Ingestion	33.9
		Chromium	6.3	Inhalation	6.4		Cobalt	15.8	Inhalation	0.9
		Total PAH	26.1	Dermal	29.9		Iron	12.0	Dermal	65.2
				External Exposure			Mercury	41.6		
							Nickel	9.6		
							Silver	6.3		
Outdoor Worker - subsurface	3.45E-05	Arsenic	69.6	Ingestion	64.4	3.20	Antimony	3.6	Ingestion	45.8
		Chromium	4.7	Inhalation	6.1		Arsenic	4.7	Inhalation	0.9
		Total PAH	24.2	Dermal	29.4		Cobalt	45.1	Dermal	53.2
				External Exposure			Iron	7.0		
							Mercury	26.6		
							Nickel	4.6		
							Silver	3.8		

Table D6.51. Summary of Risk Characterization for SWMU 217, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.00E-05	Arsenic	59.2	Ingestion	3.14	Antimony	3.7	Ingestion	8.1
		Chromium	8.2	Inhalation		Arsenic	4.4	Inhalation	0.7
		Total PAH	32.5	Dermal		Cobalt	9.8	Dermal	91.2
				External Exposure		Iron	7.4		
Future Child Resident - surface	8.00E-05	Arsenic	59.2	Ingestion	9.05	Antimony	3.4	Ingestion	26.3
		Chromium	8.2	Inhalation		Arsenic	7.5	Inhalation	1.1
		Total PAH	32.5	Dermal		Cobalt	14.1	Dermal	72.5
				External Exposure		Iron	10.6		
Future Teen Recreational User - surface	1.25E-05	Arsenic	50.2	Ingestion	2.50	Cobalt	8.2	Ingestion	1.4
		Total PAH	44.8	Inhalation		Iron	6.2	Inhalation	0.4
				Dermal		Mercury	55.0	Dermal	98.3
			External Exposure	Nickel		13.1			
						Silver	8.6		

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.52. Summary of Risk Characterization for SWMU 221

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.31E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.34E-05	Chromium PCB, Total Total PAH Uranium-238	9.9	Ingestion	6.9	<1	Nickel	57.6	Ingestion	5.7
			11.4	Inhalation	10.9				Inhalation	0.5
			73.8	Dermal	77.9				Dermal	93.8
			4.9	External Exposure	4.3					
Outdoor Worker - surface	2.75E-05	Chromium PCB, Total Total PAH Uranium-238	6.2	Ingestion	41.4	<1	Iron Nickel	39.5 42.0	Ingestion	36.9
			11.2	Inhalation	6.9				Inhalation	0.3
			76.6	Dermal	49.0				Dermal	62.8
			6.0	External Exposure	2.7					
Outdoor Worker - subsurface	5.74E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	51.9	Ingestion	60.0	3.79	Aluminum Arsenic Barium Cobalt Iron Manganese Mercury Nickel	3.3 4.9 3.2 33.1 7.5 5.9 30.0 4.7	Ingestion	43.7
			2.8	Inhalation	3.5				Inhalation	2.3
			5.4	Dermal	35.3				Dermal	54.0
			36.7	External Exposure	1.3					
			2.9							

Table D6.52. Summary of Risk Characterization for SWMU 221 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		1.19	Cobalt Mercury	33.1 30.0	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.05E-05	Chromium PCB, Total Total PAH Uranium-238	6.4 11.1 74.6 7.9	Ingestion Inhalation Dermal External Exposure	19.5 7.0 66.3 7.2	<1	Iron Nickel	25.3 55.9	Ingestion Inhalation Dermal	9.1 0.3 90.6
Future Child Resident - surface	7.05E-05	Chromium PCB, Total Total PAH Uranium-238	6.4 11.1 74.6 7.9	Ingestion Inhalation Dermal External Exposure	19.5 7.0 66.3 7.2	1.66	Barium Iron Nickel Uranium	9.5 35.4 46.0 7.1	Ingestion Inhalation Dermal	29.0 0.4 70.6
Future Teen Recreational User - surface	1.37E-05	PCB, Total Total PAH	12.2 83.0	Ingestion Inhalation Dermal External Exposure	2.1 3.4 93.0 1.5	<1	Nickel	59.6	Ingestion Inhalation Dermal	1.6 0.1 98.3

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.53. Summary of Risk Characterization for SWMU 222

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.45E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.59E-05	Chromium	6.1	Ingestion	9.8	<1	Nickel	87.1	Ingestion	2.8
		PCB, Total	28.8	Inhalation	8.4				Inhalation	0.5
		Total PAH	11.6	Dermal	35.5				Dermal	96.7
		Uranium-235	6.9	External Exposure	46.2					
Uranium-238	44.5									
Outdoor Worker - surface	3.54E-05	Chromium	3.3	Ingestion	51.2	<1	Nickel	76.7	Ingestion	21.5
		PCB, Total	24.4	Inhalation	4.5				Inhalation	0.4
		Total PAH	10.3	Dermal	19.2				Dermal	78.1
		Uranium-234	10.4	External Exposure	25.0					
		Uranium-235	4.4							
		Uranium-238	47.2							
Outdoor Worker - subsurface	5.58E-05	Arsenic	44.0	Ingestion	59.0	<1	Arsenic Nickel	32.5 36.7	Ingestion	46.7
		Cesium-137	4.7	Inhalation	3.4				Inhalation	2.9
		Chromium	2.8	Dermal	19.5				Dermal	50.4
		PCB, Total	10.7	External Exposure	18.1					
		Total PAH	6.5							
		Uranium-234	4.5							
		Uranium-235	2.8							
Uranium-238	23.5									

Table D6.53. Summary of Risk Characterization for SWMU 222 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.02E-04	Chromium	3.0	Ingestion	13.5	<1	Nickel	86.2	Ingestion	4.5
		PCB, Total	21.5	Inhalation	4.1				Inhalation	0.3
		Total PAH	8.9	Dermal	23.1				Dermal	95.2
		Uranium-234	2.1	External Exposure	59.2					
		Uranium-235	8.8							
Uranium-238	55.6									
Future Child Resident - surface	1.02E-04	Chromium	3.0	Ingestion	13.5	1.11	Nickel Uranium	79.7 18.3	Ingestion	16.1
		PCB, Total	21.5	Inhalation	4.1				Inhalation	0.5
		Total PAH	8.9	Dermal	23.1				Dermal	83.5
		Uranium-234	2.1	External Exposure	59.2					
		Uranium-235	8.8							
Uranium-238	55.6									
Future Teen Recreational User - surface	9.67E-06	PCB, Total	48.4	Ingestion	3.5	<1	Nickel	88.3	Ingestion	0.7
		Total PAH	20.4	Inhalation	4.1				Inhalation	0.1
		Uranium-238	23.7	Dermal	66.4				Dermal	99.1
				External Exposure	26.0					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.54. Summary of Risk Characterization for SWMU 227, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI				
Current Industrial Worker - surface	3.79E-06	PCB, Total	32.6	Ingestion	8.7	<1	*no COCs							
		Uranium-238	40.2	Inhalation	4.9									
				Dermal	35.9									
				External Exposure	50.5									
Future Industrial Worker - surface	6.77E-05	Cesium-137	3.3	Ingestion	8.7	<1	Nickel	80.7	Ingestion	3.7				
		Chromium	2.3	Inhalation	4.9						Inhalation	0.5		
		Neptunium-237	4.9	Dermal	35.9								Dermal	95.8
		PCB, Total	32.6	External Exposure	50.5									
		Total PAH	8.4											
		Uranium-235	5.6											
Uranium-238	40.2													
Outdoor Worker - surface	8.78E-05	Cesium-137	1.9	Ingestion	47.9	<1	Nickel Uranium	66.8 30.7	Ingestion	26.9				
		Chromium	1.3	Inhalation	2.8						Inhalation	0.4		
		Neptunium-237	3.1	Dermal	20.5								Dermal	72.7
		PCB, Total	29.1	External Exposure	28.8									
		Total PAH	7.9											
		Uranium-234	6.2											
		Uranium-235	3.7											
Uranium-238	45.0													
Outdoor Worker - subsurface	1.02E-04	Arsenic	20.0	Ingestion	53.5	<1	Arsenic Nickel Uranium	17.5 51.7 24.2	Ingestion	37.7				
		Cesium-137	1.4	Inhalation	2.5						Inhalation	0.4		
		Chromium	1.3	Dermal	21.5								Dermal	62.0
		Neptunium-237	2.4	External Exposure	22.4									
		PCB, Total	23.9											
		Total PAH	6.8											
		Uranium-234	4.9											
Uranium-235	2.9													
Uranium-238	35.0													

Table D6.54. Summary of Risk Characterization for SWMU 227, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.27E-06			See Outdoor Worker (subsurface)	<1	Nickel	51.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.74E-04	Cesium-137	4.1	Ingestion	1.02	Nickel Uranium	79.4 17.6	Ingestion	6.0 0.3 93.8
		Chromium	1.1	Inhalation					
		Cobalt-60	1.6	Dermal					
		Neptunium-237	6.1	External Exposure					
		PCB, Total	23.7						
		Total PAH	6.3						
Future Child Resident - surface	2.74E-04	Uranium-234	1.2	Ingestion	2.77	Nickel Uranium	70.7 26.6	Ingestion	20.5 0.5 79.1
		Uranium-235	6.9	Inhalation					
		Uranium-238	48.8	Dermal					
		Cesium-137	4.1	External Exposure					
		Chromium	1.1						
		Cobalt-60	1.6						
Future Teen Recreational User - surface	2.55E-05	Neptunium-237	6.1	Ingestion	<1	Nickel Uranium	82.3 14.5	Ingestion	1.0 0.1 98.9
		PCB, Total	23.7	Inhalation					
		Total PAH	6.3	Dermal					
		Uranium-234	1.2	External Exposure					
		Uranium-235	6.9						
		Uranium-238	48.8						
		PCB, Total	54.2	Ingestion			3.1		
		Total PAH	14.7	Inhalation			2.3		
		Uranium-238	21.2	Dermal			66.5		
				External Exposure			28.1		

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.55. Summary of Risk Characterization for SWMU 227, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.05E-06	PCB, Total	84.8	Ingestion	6.2	<1	*no COCs			
				Inhalation	11.3					
				Dermal	78.1					
				External Exposure	4.4					
Future Industrial Worker - surface	3.66E-05	Chromium PCB, Total Total PAH	5.1 84.8 5.3	Ingestion	6.2	1.34	Mercury Nickel	69.5 21.7	Ingestion	2.5
				Inhalation	11.3				Inhalation	0.2
				Dermal	78.1				Dermal	97.2
				External Exposure	4.4					
Outdoor Worker - surface	4.16E-05	Chromium PCB, Total Total PAH Uranium-238	3.3 86.3 5.7 3.2	Ingestion	39.0	1.21	Cobalt Mercury Nickel	12.9 64.3 19.4	Ingestion	20.0
				Inhalation	7.3				Inhalation	0.2
				Dermal	50.8				Dermal	79.8
				External Exposure	2.8					
Outdoor Worker - subsurface	5.50E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	36.6 2.0 53.3 4.3 2.4	Ingestion	53.0	1.50	Arsenic Cobalt Mercury Nickel	8.4 12.3 51.5 15.5	Ingestion	26.7
				Inhalation	4.6				Inhalation	1.0
				Dermal	40.1				Dermal	72.3
				External Exposure	2.3					

Table D6.55. Summary of Risk Characterization for SWMU 227, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	51.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.09E-04	Chromium	3.3	Ingestion	2.32	Cobalt	6.9	Ingestion	4.1
		Cobalt-60	3.6	Inhalation		Inhalation		0.1	
		PCB, Total	83.4	Dermal		Dermal		95.8	
		Total PAH	5.4	External Exposure					
		Uranium-238	4.2						
Future Child Resident - surface	1.09E-04	Chromium	3.3	Ingestion	5.99	Cobalt	11.0	Ingestion	14.8
		Cobalt-60	3.6	Inhalation		Inhalation		0.2	
		PCB, Total	83.4	Dermal		Dermal		84.9	
		Total PAH	5.4	External Exposure					
		Uranium-238	4.2						
Future Teen Recreational User - surface	2.15E-05	PCB, Total	90.8	Ingestion	1.92	Cobalt	5.6	Ingestion	0.7
		Total PAH	6.0	Inhalation		Inhalation		0.1	
				Dermal		Dermal		99.3	
				External Exposure					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.56. Summary of Risk Characterization for SWMU 228

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.30E-05	Chromium	48.1	Ingestion	2.9	1.41	Mercury	74.1	Ingestion	1.7
		Neptunium-237	22.7	Inhalation	48.3		Nickel	13.2	Inhalation	0.1
		Total PAH	8.7	Dermal	8.0		Silver	7.7	Dermal	98.2
		Uranium-238	17.0	External Exposure	40.8					
Outdoor Worker - surface	1.21E-05	Chromium	38.4	Ingestion	22.5	1.19	Mercury	72.9	Ingestion	14.1
		Neptunium-237	20.2	Inhalation	38.5		Nickel	12.5	Inhalation	0.1
		Total PAH	11.4	Dermal	6.4					
		Uranium-238	26.6	External Exposure	32.6					
Outdoor Worker - subsurface	7.99E-05	Arsenic	84.2	Ingestion	68.5	1.95	Arsenic	21.5	Ingestion	36.0
		Chromium	5.8	Inhalation	5.9		Iron	14.3	Inhalation	1.0
		Neptunium-237	3.1	Dermal	20.1		Mercury	44.4	Dermal	63.0
		Total PAH	1.7	External Exposure	5.6		Nickel	7.6		

Table D6.56. Summary of Risk Characterization for SWMU 228 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Arsenic Mercury	21.5 44.4	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.36E-05	Chromium Neptunium-237 Total PAH Uranium-235 Uranium-238	27.9 34.0 7.9 5.2 25.0	Ingestion Inhalation Dermal External Exposure	2.41	Mercury Nickel Silver	74.0 13.1 7.7	Ingestion Inhalation Dermal	2.7 0.1 97.2
Future Child Resident - surface	4.36E-05	Chromium Neptunium-237 Total PAH Uranium-235 Uranium-238	27.9 34.0 7.9 5.2 25.0	Ingestion Inhalation Dermal External Exposure	5.99	Antimony Mercury Nickel Silver Uranium	1.9 73.3 12.7 7.4 1.8	Ingestion Inhalation Dermal	10.3 0.1 89.6
Future Teen Recreational User - surface	3.04E-06	Chromium	37.6	Ingestion Inhalation Dermal External Exposure	2.02	Mercury Nickel Silver	74.3 13.2 7.7	Ingestion Inhalation Dermal	0.4 0.0 99.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.57. Summary of Risk Characterization for SWMU 27

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface	<1E-6					<1	*no COCs			

Table D6.57. Summary of Risk Characterization for SWMU 27 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

There are no surface data available for assessment.
 Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.58. Summary of Risk Characterization for SWMU 76

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.79E-06	Total PAH	93.0	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.5					
				Dermal	89.6					
				External Exposure	2.4					
Future Industrial Worker - surface	3.19E-05	PCB, Total Total PAH	4.3 93.0	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.5					
				Dermal	89.6					
				External Exposure	2.4					
Outdoor Worker - surface	3.91E-05	PCB, Total Total PAH Uranium-238	4.1 92.7 3.2	Ingestion	44.1	<1	*no COCs			
				Inhalation	0.3					
				Dermal	54.2					
				External Exposure	1.4					
Outdoor Worker - subsurface	7.07E-05	Arsenic PCB, Total Total PAH Uranium-238	44.7 2.3 51.3 1.8	Ingestion	58.9	<1	Arsenic Mercury	21.3 74.6	Ingestion Inhalation Dermal	26.2 0.1 73.6
				Inhalation	0.2					
				Dermal	40.1					
				External Exposure	0.8					

Table D6.58. Summary of Risk Characterization for SWMU 76 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Mercury	74.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.87E-05	PCB, Total Total PAH Uranium-238	4.1 91.6 4.2	Ingestion Inhalation Dermal External Exposure	21.6 0.3 74.3 3.9	<1	*no COCs			
Future Child Resident - surface	9.87E-05	PCB, Total Total PAH Uranium-238	4.1 91.6 4.2	Ingestion Inhalation Dermal External Exposure	21.6 0.3 74.3 3.9	<1	Barium	100.0	Ingestion Inhalation Dermal	9.0 1.3 89.7
Future Teen Recreational User - surface	2.06E-05	Total PAH	95.0	Ingestion Inhalation Dermal External Exposure	2.1 0.1 97.0 0.8	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.59. Summary of Risk Characterization for SWMU 165

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI				
Current Industrial Worker - surface	1.29E-05	Arsenic	27.7	Ingestion	13	<1	*no COCs							
		Cesium-137	17.5	Inhalation	2.4									
		PCB, Total	19.2	Dermal	49.7									
		Total PAH	13.7	External Exposure	35									
		Uranium-238	16.4											
		Arsenic	27.7	Ingestion	13		1.14				Arsenic	35.2	Ingestion	11.4
		Cesium-137	17.5	Inhalation	2.4		25.3				Silver	25.3	Inhalation	2.3
		Chromium	0.5	Dermal	49.7		8.8				Uranium	8.8	Dermal	86.2
		Neptunium-237	0.7	External Exposure	35									
		PCB, Total	19.2	Exposure										
Future Industrial Worker - surface	2.30E-04	Total PAH	13.7											
		Uranium-234	1.3											
		Uranium-235	2.3											
		Uranium-238	16.4											
		Arsenic	42.6	Ingestion	58.8	1.67	Arsenic	57.2	Ingestion	55.3				
		Cesium-137	8.4	Inhalation	1.1	13.9	Silver	13.9	Inhalation	1.2				
		Neptunium-237	0.4	Dermal	23.5	11.1	Uranium	11.1	Dermal	43.5				
		PCB, Total	14.2	External Exposure	16.5									
		Plutonium-239/240	0.5	Exposure										
		Thorium-230	0.8											
Outdoor Worker - surface	3.59E-04	Total PAH	10.7											
		Uranium-234	5.7											
		Uranium-235	1.3											
		Uranium-238	15.2											
		Arsenic	41.3	Ingestion	58.3	1.86	Arsenic	51.6	Ingestion	56.7				
		Cesium-137	8.1	Inhalation	1.2	7.9	Cobalt	7.9	Inhalation	1.1				
		Neptunium-237	0.3	Dermal	24.5	12.5	Silver	12.5	Dermal	42.2				
		PCB, Total	16.4	External Exposure	16.0	10.0	Uranium	10.0						
		Pentachlorophenol	0.5	Exposure										
		Plutonium-239/240	0.5											
Outdoor Worker - subsurface	3.72E-04	Thorium-230	0.7											
		Total PAH	10.4											
		Uranium-234	5.5											
		Uranium-235	1.2											
		Uranium-238	14.7											

Table D6.59. Summary of Risk Characterization for SWMU 165 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	4.65E-06	Arsenic	41.3	See Outdoor Worker (subsurface)	<1		Arsenic	51.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.36E-04	Arsenic	28.8	Ingestion	24.4	2.05	Antimony	7.3	Ingestion	17.7
		Cesium-137	21.7	Inhalation	1.1		Arsenic	38.5	Inhalation	1.2
		Chromium	0.3	Dermal	31.3		Barium	8.2	Dermal	81.1
		Naphthalene	0.2	External	43.3		Nickel	6.7		
		Neptunium-237	0.8	Exposure			Silver	23.9		
		PCB, Total	13.8				Uranium	9.2		
		Plutonium-239/240	0.1							
		Thorium-230	0.2							
Future Child Resident - surface	9.36E-04	Total PAH	10.3			7.33	Antimony	5.4	Ingestion	46.3
		Uranium-234	1.3				Arsenic	52.7	Inhalation	1.6
		Uranium-235	2.8				Barium	5.7	Dermal	52.1
		Uranium-238	19.8				Mercury	2.4		
		Arsenic	28.8	Ingestion	24.4		Nickel	4.6		
		Cesium-137	21.7	Inhalation	1.1		Silver	16.2		
		Chromium	0.3	Dermal	31.3		Uranium	10.6		
		Naphthalene	0.2	External	43.3					
		Neptunium-237	0.8	Exposure						
		PCB, Total	13.8							
		Plutonium-239/240	0.1							
		Thorium-230	0.2							
		Future Teen Recreational User - surface	1.02E-04	Total PAH	10.3				1.49	Antimony
Uranium-234	1.3					Arsenic	31.3	Inhalation		0.7
Uranium-235	2.8					Barium	9.5	Dermal		96.0
Uranium-238	19.8					Nickel	7.8			
Arsenic	35.0			Ingestion	4.8	Silver	27.9			
Cesium-137	8.3			Inhalation	1.0	Uranium	8.5			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.60. Summary of Risk Characterization for SWMU 170

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs					*no COCs			
Future Industrial Worker - surface	1.32E-06	*no COCs					*no COCs			
Outdoor Worker - surface	1.66E-06	Uranium-238	78.8	Ingestion Inhalation Dermal	45.6 0.1		*no COCs			
Outdoor Worker - subsurface	5.83E-06	Cesium-137 Uranium-238	49.9 37.3	Ingestion Inhalation Dermal External Exposure	21.7 0.1 78.3		*no COCs			

Table D6.60. Summary of Risk Characterization for SWMU 170 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)				See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.55E-06	Neptunium-237 Uranium-238	32.5	Ingestion	93.4	*no COCs			
			67.5	Inhalation					
				Dermal External Exposure					
Future Child Resident - surface	6.55E-06	Neptunium-237 Uranium-238	32.5	Ingestion	93.4	*no COCs			
			67.5	Inhalation					
				Dermal External Exposure					
Future Teen Recreational User - surface	<1E-6	*no COCs				*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.61. Summary of Risk Characterization for SWMU 158

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.18E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.11E-05	Arsenic	48.1	Ingestion	16.0	1.68	Cobalt	9.1	Ingestion	4.3
		Chromium	9.5	Inhalation	10.0		Mercury	69.1	Inhalation	1.6
		Total PAH	29.5	Dermal	62.7		Nickel	10.1	Dermal	94.1
		Uranium-238	10.6	External Exposure	11.3					
Outdoor Worker - surface	3.71E-05	Arsenic	65.7	Ingestion	64.7	1.70	Arsenic	8.9	Ingestion	29.9
		Chromium	4.0	Inhalation	4.2		Cobalt	16.6	Inhalation	1.2
		Total PAH	20.5	Dermal	26.4		Mercury	56.9	Dermal	68.9
		Uranium-238	8.7	External Exposure	4.7		Nickel	8.1		
Outdoor Worker - subsurface	3.73E-05	Arsenic	61.5	Ingestion	63.3	1.73	Arsenic	8.3	Ingestion	27.3
		Chromium	3.4	Inhalation	3.5		Cobalt	12.6	Inhalation	1.2
		Total PAH	26.5	Dermal	28.8		Mercury	56.1	Dermal	71.5
		Uranium-238	7.2	External Exposure	4.4		Nickel	8.9		

Table D6.61. Summary of Risk Characterization for SWMU 158 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	56.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.90E-05	Arsenic	54.4	Ingestion	2.92	Arsenic	4.3	Ingestion	6.9
		Chromium	4.9	Inhalation		9.9	Inhalation	0.9	
		Total PAH	24.0	Dermal		68.3	Dermal	92.3	
		Uranium-235	2.6	External Exposure		10.0			
		Uranium-238	13.9						
Future Child Resident - surface	7.90E-05	Arsenic	54.4	Ingestion	8.16	Arsenic	7.5	Ingestion	23.0
		Chromium	4.9	Inhalation		1.9	Inhalation	1.4	
		Total PAH	24.0	Dermal		14.6	Dermal	75.6	
		Uranium-235	2.6	External Exposure		2.9			
		Uranium-238	13.9			60.1			
Future Teen Recreational User - surface	1.07E-05	Arsenic	53.3	Ingestion	2.34	Cobalt	8.2	Ingestion	1.2
		Total PAH	38.3	Inhalation		71.4	Inhalation	0.4	
				Dermal		86.2	Dermal	98.4	
				External Exposure		4.7			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.62. Summary of Risk Characterization for SWMU 169

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	9.22E-06	Arsenic	12.4	Ingestion	9.4	<1	*no COCs			
		PCB, Total	32.4	Inhalation	6.8					
		Total PAH	47.1	Dermal	80.5					
				External Exposure	3.3					
Future Industrial Worker - surface	1.65E-04	Arsenic	12.4	Ingestion	9.4	2.68	Arsenic	4.8	Ingestion	4.2
		Chromium	4.3	Inhalation	6.8		Iron	6.2	Inhalation	0.4
		PCB, Total	32.4	Dermal	80.5		Mercury	32.7	Dermal	95.4
		Total PAH	47.1	External Exposure	3.3		Nickel	47.9		
		Uranium-235	0.7							
		Uranium-238	2.9							
Outdoor Worker - surface	2.21E-04	Arsenic	22.2	Ingestion	50.0	2.70	Arsenic	11.3	Ingestion	29.7
		Chromium	2.4	Inhalation	3.7		Iron	11.4	Inhalation	0.3
		PCB, Total	27.9	Dermal	44.4		Mercury	27.0	Dermal	70.0
		Total PAH	42.8	External Exposure	1.8		Nickel	38.3		
		Uranium-234	1.0							
		Uranium-235	0.5							
Uranium-238	3.1									
Outdoor Worker - subsurface	2.21E-04	Arsenic	22.1	Ingestion	49.9	4.77	Aluminum	2.3	Ingestion	38.9
		Chromium	2.4	Inhalation	3.8		Arsenic	6.4	Inhalation	1.0
		PCB, Total	27.9	Dermal	44.3		Cobalt	28.5	Dermal	60.1
		Total PAH	42.7	External Exposure	1.9		Iron	6.5		
		Uranium-234	1.0				Mercury	15.3		
		Uranium-235	0.5				Nickel	31.8		
Uranium-238	3.1									

Table D6.62. Summary of Risk Characterization for SWMU 169 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.77E-06	Total PAH	42.7	See Outdoor Worker (subsurface)	1.49	Cobalt Mercury Nickel	28.5 15.3 31.8	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.23E-04	Arsenic Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	16.5 2.6 29.9 45.1 0.3 1.1 4.5	Ingestion Inhalation Dermal External Exposure	4.66	Arsenic Iron Mercury Nickel	5.4 6.7 32.2 46.9	Ingestion Inhalation Dermal	6.8 0.2 93.0
Future Child Resident - surface	5.23E-04	Arsenic Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	16.5 2.6 29.9 45.1 0.3 1.1 4.5	Ingestion Inhalation Dermal External Exposure	12.93	Aluminum Antimony Arsenic Chromium Copper Iron Mercury Nickel Thallium Uranium	2.5 1.8 9.5 0.8 1.6 10.0 28.5 40.9 1.0 2.8	Ingestion Inhalation Dermal	22.8 0.4 76.8
Future Teen Recreational User - surface	9.84E-05	Arsenic Chromium PCB, Total Total PAH	11.6 1.3 34.0 51.8	Ingestion Inhalation Dermal External Exposure	3.76	Arsenic Iron Mercury Nickel	4.0 5.6 33.5 49.0	Ingestion Inhalation Dermal	1.1 0.1 98.7

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.63. Summary of Risk Characterization for SWMU 19

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.94E-06	Total PAH	100.0	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.2					
				Dermal External Exposure	92.3					
Future Industrial Worker - surface	8.83E-05	Total PAH	100.0	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.2					
				Dermal External Exposure	92.3					
Outdoor Worker - surface	1.08E-04	Total PAH	100.0	Ingestion	44.0	<1	*no COCs			
				Inhalation	0.1					
				Dermal External Exposure	56.0					
Outdoor Worker - subsurface	1.71E-04	Arsenic Total PAH Uranium-234 Uranium-235 Uranium-238	14.2 63.0 5.7 1.7 15.3	Ingestion	53.0	1.88	Arsenic Cobalt Copper Nickel Uranium	8.1 12.5 12.4 43.9 15.1	Ingestion Inhalation Dermal	41.9 0.4 57.7
				Inhalation	0.2					
				Dermal	38.5					
				External Exposure	8.3					

Table D6.63. Summary of Risk Characterization for SWMU 19 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.14E-06	Total PAH	63.0	See Outdoor Worker (subsurface)	<1	<1	Nickel	43.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.69E-04	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	22.2 0.1 77.7	<1	*no COCs			
Future Child Resident - surface	2.69E-04	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	22.2 0.1 77.7	<1	Beryllium Thallium	26.7 67.1	Ingestion Inhalation Dermal	45.1 0.2 54.6
Future Teen Recreational User - surface	5.81E-05	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	2.1 0.0 97.9	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.64. Summary of Risk Characterization for SWMU 138, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.68E-05	Arsenic	63.6	Ingestion	18.4	2.00	Antimony	10.7	Ingestion	2.5
		Chromium	10.7	Inhalation	12.0		Mercury	72.1	Inhalation	0.1
		PCB, Total Total PAH	15.9 9.8	Derma External Exposure	69.6		Nickel	8.2	Derma	97.4
Outdoor Worker - surface	3.20E-05	Arsenic	79.9	Ingestion	68.4	1.80	Antimony	11.1	Ingestion	19.9
		Chromium	4.1	Inhalation	4.6		Arsenic	8.9	Inhalation	0.1
		PCB, Total	9.6	Derma	27.0		Mercury	66.7	Derma	80.0
		Total PAH	6.3	External Exposure			Nickel	7.4		
Outdoor Worker - subsurface	3.25E-05	Arsenic	79.9	Ingestion	68.3	2.43	Antimony	6.9	Ingestion	28.0
		Chromium	4.3	Inhalation	4.9		Arsenic	6.7	Inhalation	0.6
		PCB, Total	9.5	Derma	26.8		Cobalt	6.6	Derma	71.3
		Total PAH	6.2	External Exposure			Iron	6.0		
							Mercury	55.4		
							Nickel	6.0		

Table D6.64. Summary of Risk Characterization for SWMU 138, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	55.4	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.14E-05	Arsenic	73.4	Ingestion	3.45	Antimony	10.7	Ingestion	4.1
		Chromium	5.6	Inhalation		Arsenic	3.8	Inhalation	0.1
		PCB, Total	12.8	Dermal		Mercury	71.7	Dermal	95.8
		Total PAH	8.2	External Exposure		Nickel	8.1		
		Silver	4.6						
Future Child Resident - surface	6.14E-05	Arsenic	73.4	Ingestion	8.91	Antimony	11.0	Ingestion	14.8
		Chromium	5.6	Inhalation		Arsenic	7.2	Inhalation	0.1
		PCB, Total	12.8	Dermal		Cadmium	1.2	Dermal	85.1
		Total PAH	8.2	External Exposure		Mercury	68.3		
		Nickel	7.6						
		Silver	4.3						
Future Teen Recreational User - surface	9.07E-06	Arsenic	66.0	Ingestion	2.86	Antimony	10.6	Ingestion	0.7
		PCB, Total	18.4	Inhalation		Mercury	72.8	Inhalation	0.0
		Total PAH	11.9	Dermal		Nickel	8.3	Dermal	99.3
				External Exposure		Silver	4.7		

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.65. Summary of Risk Characterization for SWMU 138, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.15E-06	*no COCs				<1	Nickel	65.8	Ingestion Inhalation Dermal	1.0 0.3 98.6
Outdoor Worker - surface	1.37E-06	*no COCs				<1	Nickel	65.8	Ingestion Inhalation Dermal	9.2 0.3 90.4
Outdoor Worker - subsurface	2.78E-05	Arsenic Chromium	89.5 5.5	Ingestion Inhalation Dermal External Exposure	71.3 5.7 23.0	1.25	Arsenic Mercury Nickel Silver	12.5 61.7 14.5 9.2	Ingestion Inhalation Dermal	20.7 0.1 79.2

Table D6.65. Summary of Risk Characterization for SWMU 138, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	61.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.43E-06	PCB, Total Total PAH	42.0 57.5	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	65.7 34.3	Ingestion Inhalation Dermal	1.7 0.2 98.1
Future Child Resident - surface	3.43E-06	PCB, Total Total PAH	42.0 57.5	Ingestion Inhalation Dermal External Exposure	1.17	Nickel Silver	65.8 34.2	Ingestion Inhalation Dermal	6.6 0.4 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	65.7 34.3	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.66. Summary of Risk Characterization for SWMU 180, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.30E-06	Arsenic	97.6	Ingestion Inhalation Dermal External Exposure	25.5 2.6 71.9	<1	*no COCs			
Future Industrial Worker - surface	7.69E-05	Arsenic Chromium	97.6 2.4	Ingestion Inhalation Dermal External Exposure	25.5 2.6 71.9	1.63	Arsenic Mercury Nickel	29.0 56.6 12.6	Ingestion Inhalation Dermal	8.5 0.4 91.1
Outdoor Worker - surface	1.82E-04	Arsenic Chromium	99.2 0.7	Ingestion Inhalation Dermal External Exposure	76.7 0.8 22.5	2.08	Arsenic Mercury Nickel	54.0 36.8 7.9	Ingestion Inhalation Dermal	47.2 0.2 52.6
Outdoor Worker - subsurface	1.84E-04	Arsenic Chromium	99.1 0.8	Ingestion Inhalation Dermal External Exposure	76.6 0.9 22.5	2.51	Arsenic Cobalt Mercury Nickel	45.3 9.5 30.5 6.8	Ingestion Inhalation Dermal	47.9 0.8 51.3

Table D6.66. Summary of Risk Characterization for SWMU 180, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.30E-06	Arsenic	99.1	See Outdoor Worker (subsurface)	<1	<1	Arsenic Mercury	45.3 30.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.21E-04	Arsenic Chromium	98.9 1.1	Ingestion Inhalation Dermal External Exposure	54.7 1.2 44.1	2.91	Arsenic Mercury Nickel	32.0 54.2 12.0	Ingestion Inhalation Dermal	13.3 0.2 86.5
Future Child Resident - surface	3.21E-04	Arsenic Chromium	98.9 1.1	Ingestion Inhalation Dermal External Exposure	54.7 1.2 44.1	9.41	Antimony Arsenic Mercury Nickel	1.1 48.4 41.3 9.0	Ingestion Inhalation Dermal	38.4 0.3 61.3
Future Teen Recreational User - surface	4.25E-05	Arsenic	99.2	Ingestion Inhalation Dermal External Exposure	8.4 0.8 90.8	2.21	Arsenic Mercury Nickel	24.8 59.9 13.3	Ingestion Inhalation Dermal	2.4 0.1 97.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.67. Summary of Risk Characterization for SWMU 180, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.57E-05	Arsenic	80.7	Ingestion	21.8	<1	Nickel	65.6	Ingestion	7.8
		Chromium	9.4	Inhalation	9.6				Inhalation	0.7
		Total PAH	9.9	Dermal External Exposure	68.6				Dermal	91.6
Outdoor Worker - surface	3.35E-05	Arsenic	91.1	Ingestion	72.8	<1	Arsenic Nickel	51.5	Ingestion	44.7
		Chromium	3.3	Inhalation	3.3				Inhalation	0.4
		Total PAH	5.7	Dermal External Exposure	23.8				Dermal	54.9
Outdoor Worker - subsurface	3.15E-05	Arsenic	89.3	Ingestion	71.6	1.16	Arsenic Mercury Nickel	15.2	Ingestion	23.0
		Chromium	4.7	Inhalation	4.8				Inhalation	1.1
		Total PAH	6.0	Dermal External Exposure	23.6				Dermal	75.9

Table D6.67. Summary of Risk Characterization for SWMU 180, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	65.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.13E-05	Arsenic	87.6	Ingestion	<1	Arsenic Nickel	29.5	Ingestion	12.2
		Chromium	4.7	Inhalation				0.3	
		Total PAH	7.7	Dermal External Exposure				87.4	
Future Child Resident - surface	6.13E-05	Arsenic	87.6	Ingestion	1.68	Arsenic Nickel	45.7	Ingestion	36.1
		Chromium	4.7	Inhalation				0.5	
		Total PAH	7.7	Dermal External Exposure				63.4	
Future Teen Recreational User - surface	8.43E-06	Arsenic	84.7	Ingestion	<1	Nickel	69.1	Ingestion	2.2
		Total PAH	12.1	Inhalation				0.2	
				Dermal External Exposure				97.7	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.68. Summary of Risk Characterization for SWMU 180, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.50E-05	Arsenic Chromium	89.5	Ingestion	23.4	<1	Nickel Silver	44.7	Ingestion	6.9
			10.4	Inhalation	10.6			29.9	Inhalation	0.5
				Dermal External Exposure	66.0				Dermal	92.5
Outdoor Worker - surface	3.33E-05	Arsenic Chromium	96.5	Ingestion	74.6	<1	Arsenic Nickel	48.0	Ingestion	41.7
			3.5	Inhalation	3.5			30.5	Inhalation	0.3
				Dermal External Exposure	21.9				Dermal	58.0
Outdoor Worker - subsurface	3.41E-05	Arsenic Chromium	96.1	Ingestion	74.2	<1	Arsenic Nickel	41.7	Ingestion	43.1
			3.9	Inhalation	4.0			27.5	Inhalation	2.0
				Dermal External Exposure	21.8				Dermal	54.9

Table D6.68. Summary of Risk Characterization for SWMU 180, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.97E-05	Arsenic Chromium	94.9 5.1	Ingestion	52.5	<1	Arsenic Nickel Silver	26.5	Ingestion	11.0
				Inhalation	5.2			43.1	Inhalation	0.3
				Dermal External Exposure	42.4			28.9	Dermal	88.8
Future Child Resident - surface	5.97E-05	Arsenic Chromium	94.9 5.1	Ingestion	52.5	1.92	Arsenic Nickel Silver	42.2	Ingestion	33.4
				Inhalation	5.2			33.9	Inhalation	0.4
				Dermal External Exposure	42.4			22.7	Dermal	66.2
Future Teen Recreational User - surface	7.82E-06	Arsenic	96.4	Ingestion	8.2	<1	Nickel Silver	46.8	Ingestion	1.9
				Inhalation	3.7			31.4	Inhalation	0.1
				Dermal External Exposure	88.1				Dermal	97.9

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.69. Summary of Risk Characterization for SWMU 180, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.39E-05	Arsenic Chromium	83.0	Ingestion	21.9	<1	Nickel	30.3	Ingestion	8.1
			14.3	Inhalation	14.5			Inhalation	3.6	
				Dermal External Exposure	63.6			Dermal	88.4	
Outdoor Worker - surface	2.97E-05	Arsenic Chromium	93.5	Ingestion	72.9	<1	Arsenic Iron Nickel	27.7	Ingestion	45.7
			5.0	Inhalation	5.0			Inhalation	2.1	
				Dermal External Exposure	22.1			Dermal	52.2	
Outdoor Worker - subsurface	2.85E-05	Arsenic Chromium	93.6	Ingestion	72.8	1.43	Arsenic Cobalt Iron Mercury Nickel	11.6	Ingestion	32.8
			5.2	Inhalation	5.3			Inhalation	1.1	
				Dermal	21.9			Dermal	66.1	
				Dermal External Exposure					44.6 9.2	

Table D6.69. Summary of Risk Characterization for SWMU 180, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	44.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.39E-05	Arsenic	90.8	Ingestion	<1	Arsenic	16.3	Ingestion	12.8
		Chromium	7.2	Inhalation		13.2	Inhalation	1.9	
		Total PAH	2.1	Dermal		29.3	Dermal	85.3	
Future Child Resident - surface	5.39E-05	Arsenic	90.8	Ingestion	2.84	Arsenic	24.7	Ingestion	37.0
		Chromium	7.2	Inhalation		5.3	Inhalation	2.7	
		Total PAH	2.1	Dermal		5.4	Dermal	60.3	
				External Exposure		16.8			
				External Exposure		5.9			
Future Teen Recreational User - surface	7.11E-06	Arsenic	91.5	Ingestion	<1	Nickel	32.7	Ingestion	2.3
				Inhalation		19.6	Inhalation	1.0	
				Dermal		87.0	Dermal	96.7	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.70. Summary of Risk Characterization for SWMU 181

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.34E-06	*no COCs				<1	Thallium	97.8	Ingestion Inhalation Dermal	17.2 82.8
Outdoor Worker - surface	1.27E-06	*no COCs				<1	Thallium	99.1	Ingestion Inhalation Dermal	66.6 33.4
Outdoor Worker - subsurface	2.19E-06					<1	Thallium	98.7	Ingestion Inhalation Dermal	66.3 33.7

Table D6.70. Summary of Risk Characterization for SWMU 181 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.23E-06	Chromium Total PAH	45.4 54.6	Ingestion Inhalation Dermal External Exposure	<1	Thallium	98.0	Ingestion Inhalation Dermal	25.5 74.5
Future Child Resident - surface	3.23E-06	Chromium Total PAH	45.4 54.6	Ingestion Inhalation Dermal External Exposure	<1	Thallium	98.9	Ingestion Inhalation Dermal	58.2 41.8
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Thallium	97.5	Ingestion Inhalation Dermal	5.1 94.9

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.71. Summary of Risk Characterization for SWMU 195, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	2.10E-06	Chromium	99.7	Ingestion	100.0	<1	Nickel	63.4	Ingestion	1.0	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		98.6
Outdoor Worker - surface	1.56E-06	Chromium	99.7	Ingestion	100.0	<1	Nickel	63.5	Ingestion	9.1	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		90.6
Outdoor Worker - subsurface	3.32E-05	Arsenic Cesium-137 Chromium	85.1 9.7 4.3	Ingestion	66.2	<1	Arsenic Nickel	41.8 35.7	Ingestion	40.1	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		59.5

Table D6.71. Summary of Risk Characterization for SWMU 195, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.08E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	63.4 33.7	Ingestion Inhalation Dermal	1.7 0.2 98.1
Future Child Resident - surface	4.08E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	1.07	Nickel Silver	63.5 33.7	Ingestion Inhalation Dermal	6.5 0.4 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	63.3 33.8	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.72. Summary of Risk Characterization for SWMU 195, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.95E-06	Chromium	76.8	Ingestion Inhalation Dermal External Exposure	1.8 76.8 21.4	<1	*no COCs			
Outdoor Worker - surface	1.66E-06	Chromium	66.7	Ingestion Inhalation Dermal External Exposure	14.6 66.8 18.6	<1	*no COCs			
Outdoor Worker - subsurface	1.78E-06	Chromium	77.6	Ingestion Inhalation Dermal External Exposure	9.8 77.7 12.5	<1	*no COCs			

Table D6.72. Summary of Risk Characterization for SWMU 195, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.29E-06	Chromium Total PAH	67.8 32.2	Ingestion Inhalation Dermal External Exposure	<1	Silver	94.3	Ingestion Inhalation Dermal	1.7 98.3
Future Child Resident - surface	4.29E-06	Chromium Total PAH	67.8 32.2	Ingestion Inhalation Dermal External Exposure	<1	Silver	94.5	Ingestion Inhalation Dermal	6.4 93.6
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Silver	94.3	Ingestion Inhalation Dermal	0.3 99.7

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.73. Summary of Risk Characterization for SWMU 195, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.36E-06	Chromium	70.7	Ingestion	2.2	<1	Nickel	95.3	Ingestion	1.0
				Inhalation	71.0				Inhalation	0.5
				Dermal External Exposure	26.8				Dermal	98.5
Outdoor Worker - surface	2.07E-06	Chromium	59.5	Ingestion	17.7	<1	*no COCs			
				Inhalation	59.7					
				Dermal External Exposure	22.6					
Outdoor Worker - subsurface	2.81E-05	Arsenic Chromium	92.9 4.6	Ingestion	72.9	<1	Arsenic Nickel	43.6 48.5	Ingestion	41.3
				Inhalation	4.7				Inhalation	2.5
				Dermal External Exposure	22.4				Dermal	56.2

Table D6.73. Summary of Risk Characterization for SWMU 195, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	5.33E-06	Chromium Total PAH	60.6 39.2	8.7	<1	Nickel	95.4	Ingestion	1.7	
				60.9				Inhalation		0.3
				30.4				Dermal External Exposure		98.1
Future Child Resident - surface	5.33E-06	Chromium Total PAH	60.6 39.2	8.7	<1	Nickel	95.5	Ingestion	6.4	
				60.9				Inhalation		0.5
				30.4				Dermal External Exposure		93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	95.3	Ingestion Inhalation Dermal	0.3 0.1 99.6	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.74. Summary of Risk Characterization for SWMU 195, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	1.76E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	95.9	Ingestion	1.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.30E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	96.1	Ingestion	9.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		90.6
Outdoor Worker - subsurface	2.55E-05	Arsenic Chromium	95.1 4.9	Ingestion	73.5	<1	Arsenic Nickel	37.7 39.2	Ingestion	37.9	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		61.8

Table D6.74. Summary of Risk Characterization for SWMU 195, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.41E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	95.9	Ingestion Inhalation Dermal	1.7 0.3 98.1
Future Child Resident - surface	3.41E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.0	Ingestion Inhalation Dermal	6.4 0.5 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	95.8	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.75. Summary of Risk Characterization for SWMU 195, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1				
Future Industrial Worker - surface	2.32E-06	Chromium	82.1	Ingestion	1.3	<1	Nickel	96.5	Ingestion	1.0
				Inhalation	82.5				Inhalation	0.5
				Dermal External Exposure	16.1				Dermal	98.5
Outdoor Worker - surface	1.91E-06	Chromium	73.8	Ingestion	11.4	<1	Nickel	96.7	Ingestion	9.0
				Inhalation	74.1				Inhalation	0.5
				Dermal External Exposure	14.5				Dermal	90.5
Outdoor Worker - subsurface	2.61E-05	Arsenic Cesium-137 Chromium	81.3 11.3 5.4	Ingestion	63.8	<1	Arsenic Nickel	34.0 39.3	Ingestion	37.5
				Inhalation	5.5				Inhalation	0.3
				Dermal External Exposure	19.5 11.2				Dermal	62.2

Table D6.75. Summary of Risk Characterization for SWMU 195, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.94E-06	Chromium Total PAH	74.7 25.0	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.5	Ingestion Inhalation Dermal	1.7 0.3 98.0
Future Child Resident - surface	4.94E-06	Chromium Total PAH	74.7 25.0	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.7	Ingestion Inhalation Dermal	6.5 0.5 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	96.5	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.76. Summary of Risk Characterization for SWMU 195, EU 6

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	5.67E-06	Chromium Total PAH	26.0	Ingestion	5.6	<1	Nickel	97.5	Ingestion	1.0
			73.8	Inhalation	26.3				Inhalation	0.5
				Dermal External Exposure	68.1				Dermal	98.5
Outdoor Worker - surface	6.21E-06	Chromium Total PAH	17.6	Ingestion	36.2	<1	Nickel	97.6	Ingestion	9.1
			82.3	Inhalation	17.8				Inhalation	0.5
				Dermal External Exposure	46.0				Dermal	90.5
Outdoor Worker - subsurface	3.25E-05	Arsenic Cesium-137 Chromium Total PAH	77.7	Ingestion	65.4	<1	Arsenic Nickel	37.3 43.7	Ingestion	34.5
			6.0	Inhalation	4.2				Inhalation	0.3
			4.2	Dermal	24.4				Dermal	65.2
			12.1	External Exposure	6.0					

Table D6.76. Summary of Risk Characterization for SWMU 195, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.56E-05	Chromium Total PAH	18.3 81.6	Ingestion	18.1	<1	Nickel	97.5	Ingestion	1.7
				Inhalation	18.5				Inhalation	0.3
				Dermal External Exposure	63.4				Dermal	98.0
Future Child Resident - surface	1.56E-05	Chromium Total PAH	18.3 81.6	Ingestion	18.1	<1	Nickel	97.6	Ingestion	6.5
				Inhalation	18.5				Inhalation	0.5
				Dermal External Exposure	63.4				Dermal	92.9
Future Teen Recreational User - surface	3.03E-06	Total PAH	91.1	Ingestion	1.9	<1	Nickel	97.5	Ingestion	0.3
				Inhalation	9.0				Inhalation	0.1
				Dermal External Exposure	89.1				Dermal	99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.77. Summary of Risk Characterization for SWMU 195, EU 7

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.63E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.21E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.17E-05	Arsenic Chromium	94.5 5.4	Ingestion Inhalation Dermal External Exposure	73.0 5.6 21.4	<1	Arsenic Cobalt	32.8 50.6	Ingestion Inhalation Dermal	60.4 0.5 39.1

Table D6.77. Summary of Risk Characterization for SWMU 195, EU 7 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.17E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Silver	92.8	Ingestion Inhalation Dermal	1.6 98.4
Future Child Resident - surface	3.17E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Silver	93.1	Ingestion Inhalation Dermal	6.3 93.7
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Silver	92.7	Ingestion Inhalation Dermal	0.3 99.7

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.78. Summary of Risk Characterization for SWMU 195, EU 8

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.76E-05	Arsenic	66.0	Ingestion	18.8	<1	Cobalt Nickel	38.5	Ingestion	12.1
		Chromium	12.8	Inhalation	13.4				Inhalation	1.1
		Total PAH	20.7	Dermal External Exposure	67.8				Dermal	86.7
Outdoor Worker - surface	3.40E-05	Arsenic	81.9	Ingestion	69.0	<1	Arsenic Cobalt Nickel	25.7	Ingestion	57.0
		Chromium	4.9	Inhalation	5.1				Inhalation	0.6
		Total PAH	13.1	Dermal External Exposure	25.9				Dermal	42.4
Outdoor Worker - subsurface	3.32E-05	Arsenic	80.8	Ingestion	66.4	<1	Arsenic Cobalt Nickel	23.0	Ingestion	49.1
		Cesium-137	6.4	Inhalation	4.0				Inhalation	2.0
		Chromium	3.9	Dermal	23.3				Dermal	48.9
		Total PAH	8.8	External Exposure	6.3					

Table D6.78. Summary of Risk Characterization for SWMU 195, EU 8 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.47E-05	Arsenic	75.9	Ingestion	2.96	Arsenic	17.6	Ingestion	18.6
		Chromium	6.8	Inhalation		Cobalt	39.6	Inhalation	0.6
		Total PAH	17.1	Dermal External Exposure		Nickel	34.2	Dermal	80.8
Future Child Resident - surface	6.47E-05	Arsenic	75.9	Ingestion	2.96	Arsenic	23.8	Ingestion	48.1
		Chromium	6.8	Inhalation		Cobalt	45.1	Inhalation	0.8
		Total PAH	17.1	Dermal External Exposure		Nickel	22.9	Dermal	51.2
Future Teen Recreational User - surface	9.34E-06	Arsenic	69.8	Ingestion	<1	Cobalt	36.7	Ingestion	3.5
		Total PAH	25.7	Inhalation		Nickel	40.1	Inhalation	0.3
				Dermal External Exposure			89.0	Dermal	96.2

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.79. Summary of Risk Characterization for SWMU 195, EU 9

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	2.02E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	96.3	Ingestion	1.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.50E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	96.5	Ingestion	9.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		90.5
Outdoor Worker - subsurface	2.64E-05	Arsenic Chromium	94.3 5.6	Ingestion	72.9	<1	Arsenic Nickel	38.6 42.7	Ingestion	35.3	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		64.4

Table D6.79. Summary of Risk Characterization for SWMU 195, EU 9 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.93E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.3	Ingestion Inhalation Dermal	1.7 0.3 98.1
Future Child Resident - surface	3.93E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.4	Ingestion Inhalation Dermal	6.5 0.5 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	96.2	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.80. Summary of Risk Characterization for SWMU 195, EU 10

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.50E-06	Chromium	99.5	Ingestion	100.0	<1	Nickel Silver	57.6	Ingestion	1.0
				Inhalation				40.6	Inhalation	0.3
				Dermal External Exposure					Dermal	98.7
Outdoor Worker - surface	1.11E-06	Chromium	99.5	Ingestion	100.0	<1	Nickel	57.7	Ingestion	9.1
				Inhalation					Inhalation	0.3
				Dermal External Exposure					Dermal	90.6
Outdoor Worker - subsurface	2.47E-05	Arsenic Chromium	95.7 4.2	Ingestion	74.0 4.3 21.7	<1	Arsenic Nickel	35.2	Ingestion	34.9
				Inhalation					Inhalation	1.8
				Dermal External Exposure					Dermal	63.4

Table D6.80. Summary of Risk Characterization for SWMU 195, EU 10 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.91E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	57.6 40.7	Ingestion Inhalation Dermal	1.7 0.2 98.1
Future Child Resident - surface	2.91E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	1.24	Nickel Silver	57.7 40.6	Ingestion Inhalation Dermal	6.6 0.3 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel Silver	57.5 40.7	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.81. Summary of Risk Characterization for SWMU 195, EU 11

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.53E-05	Arsenic Chromium	88.4 11.0	Ingestion	23.1	<1	Cobalt Nickel	32.8	Ingestion	13.6
				Inhalation	11.8			19.7	Inhalation	1.8
				Dermal External Exposure	65.1				Dermal	84.6
Outdoor Worker - surface	3.38E-05	Arsenic Chromium	96.1 3.7	Ingestion	74.2	1.29	Aluminum Arsenic Cobalt Iron Nickel	11.7	Ingestion	60.3
				Inhalation	4.0			15.7	Inhalation	0.8
				Dermal	21.8			37.4	Dermal	38.9
				External Exposure				11.3		9.9
Outdoor Worker - subsurface	3.51E-05	Arsenic Cesium-137 Chromium	88.9 5.3 4.0	Ingestion	69.5	1.15	Aluminum Arsenic Cobalt Iron Nickel	9.0	Ingestion	55.1
				Inhalation	4.2			16.9	Inhalation	1.4
				Dermal	21.1			28.2	Dermal	43.5
				External Exposure	5.2			13.5		13.7

Table D6.81. Summary of Risk Characterization for SWMU 195, EU 11 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	6.06E-05	Arsenic Chromium	94.3 5.4	Ingestion	1.47	Aluminum Arsenic Barium Cobalt Iron Nickel	10.5 11.4 8.9 33.5 10.1 18.4	Ingestion	20.8	
				Inhalation				Inhalation		0.9
				Dermal External Exposure				Dermal		78.3
Future Child Resident - surface	6.06E-05	Arsenic Chromium	94.3 5.4	Ingestion	5.55	Aluminum Arsenic Barium Cobalt Iron Nickel Thallium Vanadium	11.5 14.7 5.8 36.5 11.0 11.8 3.2 5.0	Ingestion	51.4	
				Inhalation				Inhalation		1.1
				Dermal External Exposure				Dermal		47.5
Future Teen Recreational User - surface	7.92E-06	Arsenic	95.9	Ingestion	1.03	Aluminum Barium Cobalt Nickel	9.8 10.6 31.8 22.0	Ingestion	4.0	
				Inhalation				Inhalation		0.5
				Dermal External Exposure				Dermal		95.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.82. Summary of Risk Characterization for SWMU 195, EU 12

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	2.34E-06	Chromium	99.7	Ingestion	100.0	<1	Nickel	86.0	Ingestion	1.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.73E-06	Chromium	99.7	Ingestion	100.0	<1	Nickel	86.2	Ingestion	8.9	
				Inhalation					Inhalation		0.4
				Dermal External Exposure					Dermal		90.6
Outdoor Worker - subsurface	2.75E-05	Arsenic Chromium	94.2 5.8	Ingestion	72.8	<1	Arsenic Nickel	39.6 42.4	Ingestion	43.8	
				Inhalation					Inhalation		2.3
				Dermal External Exposure					Dermal		53.9

Table D6.82. Summary of Risk Characterization for SWMU 195, EU 12 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.54E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	Nickel	86.0	Ingestion Inhalation Dermal	1.7 0.3 98.1
Future Child Resident - surface	4.54E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	Nickel	86.2	Ingestion Inhalation Dermal	6.4 0.5 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	85.9	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Table D6.83. Summary of Risk Characterization for SWMU 195, EU 13

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	2.18E-06	Chromium	99.7	Ingestion	100.0	<1	Nickel	95.4	Ingestion	1.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.61E-06	Chromium	99.7	Ingestion	100.0	<1	Nickel	95.7	Ingestion	8.9	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		90.6
Outdoor Worker - subsurface	2.33E-05	Arsenic Chromium	94.5 5.5	Ingestion	73.0	<1	Arsenic Nickel	37.6 43.1	Ingestion	34.7	
				Inhalation					Inhalation		0.3
				Dermal External Exposure					Dermal		65.0

Table D6.83. Summary of Risk Characterization for SWMU 195, EU 13 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.23E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	Nickel	95.4	Ingestion Inhalation Dermal	1.7 0.3 98.1
Future Child Resident - surface	4.23E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	Nickel	95.6	Ingestion Inhalation Dermal	6.4 0.5 93.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	95.4	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.84. Summary of Risk Characterization for SWMU 195, EU 14

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	1.98E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	95.9	Ingestion	1.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.46E-06	Chromium	99.6	Ingestion	100.0	<1	Nickel	96.1	Ingestion	9.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		90.6
Outdoor Worker - subsurface	2.61E-05	Arsenic Chromium	94.4 5.6	Ingestion	72.9	<1	Arsenic Mercury Nickel	15.7 61.2 15.8	Ingestion	21.8	
				Inhalation					Inhalation		0.1
				Dermal External Exposure					Dermal		78.0

Table D6.84. Summary of Risk Characterization for SWMU 195, EU 14 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	61.2	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.84E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	95.9	Ingestion Inhalation Dermal	1.7 0.3 98.1
Future Child Resident - surface	3.84E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Nickel	96.1	Ingestion Inhalation Dermal	6.4 0.5 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	95.9	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.85. Summary of Risk Characterization for SWMU 195, EU 15

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.60E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.18E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.56E-05	Arsenic Cesium-137 Chromium	86.0 8.8 5.1	Ingestion Inhalation Dermal External Exposure	66.6 5.2 19.5 8.7	<1	Arsenic	96.6	Ingestion Inhalation Dermal	74.5 0.3 25.1

Table D6.85. Summary of Risk Characterization for SWMU 195, EU 15 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.10E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.10E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.86. Summary of Risk Characterization for SWMU 195, EU 16

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	1.48E-06	Chromium	99.4	Ingestion	100.0	<1	Nickel	97.3	Ingestion	1.0	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		98.5
Outdoor Worker - surface	1.10E-06	Chromium	99.4	Ingestion	100.0	<1	Nickel	97.5	Ingestion	9.1	
				Inhalation					Inhalation		0.5
				Dermal External Exposure					Dermal		90.5
Outdoor Worker - subsurface	3.84E-06	Cesium-137 Chromium	66.5 33.4	Ingestion	0.7 33.5 65.7	<1	Mercury Nickel	80.7 16.7	Ingestion	12.6 0.7 86.6	
				Inhalation					Inhalation		
				Dermal External Exposure					Dermal		

Table D6.86. Summary of Risk Characterization for SWMU 195, EU 16 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	80.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.88E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	Nickel	97.3	Ingestion Inhalation Dermal	1.7 0.3 98.0
Future Child Resident - surface	2.88E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	Nickel	97.4	Ingestion Inhalation Dermal	6.5 0.5 93.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Nickel	97.3	Ingestion Inhalation Dermal	0.3 0.1 99.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.87. Summary of Risk Characterization for SWMU 195, EU 17

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1		*no COCs		
Future Industrial Worker - surface	1.38E-05	Chromium	19.7	Ingestion	6.0	<1	Nickel	45.0	Ingestion	2.1
		PCB, Total	28.6	Inhalation	21.9				Inhalation	0.2
		Total PAH	38.7	Dermal	60.3				Dermal	97.7
		Uranium-238	10.6	External Exposure	11.7					
Outdoor Worker - surface	1.55E-05	Chromium	13.0	Ingestion	38.1	<1	Nickel	41.6	Ingestion	17.1
		PCB, Total	29.4	Inhalation	14.4				Inhalation	0.2
		Total PAH	42.0	Dermal	39.8				Dermal	82.7
		Uranium-238	13.6	External Exposure	7.7					
Outdoor Worker - subsurface	3.47E-05	Arsenic	65.0	Ingestion	63.3	1.10	Arsenic Mercury Nickel	12.8 61.1 12.2	Ingestion	22.5
		Chromium	4.8	Inhalation	5.5				Inhalation	0.9
		PCB, Total	13.1	Dermal	28.8				Dermal	76.7
		Total PAH	12.2	External Exposure	2.5					
Uranium-238	4.3									

Table D6.87. Summary of Risk Characterization for SWMU 195, EU 17 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	61.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.20E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	12.6 27.6 38.7 4.0 17.1	Ingestion	1.34	Mercury Nickel Silver Thallium	14.6 42.6 29.0 10.9	Ingestion	12.6
				Inhalation				Inhalation	
Future Child Resident - surface	4.20E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	12.6 27.6 38.7 4.0 17.1	Dermal	1.34	Mercury Nickel Silver Thallium	14.6 42.6 29.0 10.9	Dermal	87.2
				External Exposure				External Exposure	
Future Teen Recreational User - surface	6.85E-06	PCB, Total Total PAH	36.2 51.3	Ingestion	<1	Nickel Silver	45.3 30.9	Ingestion	0.6
				Inhalation				Inhalation	
				Dermal				Dermal	99.4
				External Exposure				External Exposure	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.88. Summary of Risk Characterization for SWMU 486

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.11E-06	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9		*no COCs			
Future Industrial Worker - surface	1.99E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9		*no COCs			
Outdoor Worker - surface	1.48E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	1.1 0.0 98.9		*no COCs			
Outdoor Worker - subsurface	1.48E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	1.1 0.0 98.9		*no COCs			

Table D6.88. Summary of Risk Characterization for SWMU 486 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)					See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.00E-04	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9		*no COCs			
Future Child Resident - surface	1.00E-04	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9		*no COCs			
Future Teen Recreational User - surface	4.17E-06	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9		*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.89. Summary of Risk Characterization for SWMU 487

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs					*no COCs			
Future Industrial Worker - surface	1.60E-05	Cesium-137	100.0	Ingestion	0.1		*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.9					
Outdoor Worker - surface	1.20E-05	Cesium-137	100.0	Ingestion	1.1		*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	98.9					
Outdoor Worker - subsurface	1.20E-05	Cesium-137	100.0	Ingestion	1.1		*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	98.9					

Table D6.89. Summary of Risk Characterization for SWMU 487 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)					See Outdoor Worker (subsurface)	
Future Adult Resident - surface	8.07E-05	Cesium-137	100.0	Ingestion 0.1 Inhalation 0.0 Dermal External Exposure 99.9			*no COCs			
Future Child Resident - surface	8.07E-05	Cesium-137	100.0	Ingestion 0.1 Inhalation 0.0 Dermal External Exposure 99.9			*no COCs			
Future Teen Recreational User - surface	3.36E-06	Cesium-137	100.0	Ingestion 0.1 Inhalation 0.0 Dermal External Exposure 99.9			*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.90. Summary of Risk Characterization for SWMU 492

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	2.96E-05	Chromium	6.5	Ingestion	9.0	<1	*no COCs				
		PCB, Total	44.5	Inhalation	9.9						
		Uranium-238	42.7	Dermal	40.5						
				External Exposure	40.7						
Future Industrial Worker - surface	5.28E-04	Arsenic	2.8	Ingestion	9.0	2.13	Beryllium	11.4	Ingestion	15.1	
		Chromium	6.5	Inhalation	9.9		Chromium				5.8
		PCB, Total	44.5	Dermal	40.5		Uranium				77.5
		Uranium-234	0.5	External Exposure	40.7						
		Uranium-235	2.7								
		Uranium-238	42.7								
Outdoor Worker - surface	6.92E-04	Arsenic	5.1	Ingestion	48.6	3.62	Arsenic	6.1	Ingestion	63.0	
		Chromium	3.7	Inhalation	5.6		Beryllium				5.4
		PCB, Total	39.3	Dermal	22.8		Uranium				84.5
		Uranium-234	2.8	External Exposure	23.0						
		Uranium-235	1.8								
		Uranium-238	47.2								
Outdoor Worker - subsurface	6.95E-04	Arsenic	5.1	Ingestion	48.4	3.62	Arsenic	6.1	Ingestion	63.0	
		Cesium-137	0.4	Inhalation	5.5		Beryllium				5.4
		Chromium	3.7	Dermal	22.7		Uranium				84.5
		PCB, Total	39.1	External Exposure	23.3						
		Uranium-234	2.7								
		Uranium-235	1.8								
Uranium-238	47.0										

Table D6.90. Summary of Risk Characterization for SWMU 492 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	8.69E-06	PCB, Total Uranium-238	39.1 47.0	See Outdoor Worker (subsurface)	1.13	Uranium	84.5	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	2.02E-03	Arsenic Chromium Cobalt-60 Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	3.1 3.3 0.1 0.2 34.2 0.6 3.6 54.9	Ingestion Inhalation Dermal External Exposure	3.97	Arsenic Beryllium Chromium Uranium	4.6 10.4 5.3 78.6	Ingestion Inhalation Dermal	22.7 0.2 77.1	
Future Child Resident - surface	2.02E-03	Arsenic Chromium Cobalt-60 Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	3.1 3.3 0.1 0.2 34.2 0.6 3.6 54.9	Ingestion Inhalation Dermal External Exposure	15.45	Arsenic Beryllium Chromium Uranium Vanadium	5.8 6.5 3.1 83.2 1.0	Ingestion Inhalation Dermal	54.4 0.2 45.4	
Future Teen Recreational User - surface	2.10E-04	Arsenic Chromium PCB, Total Uranium-235 Uranium-238	3.9 3.0 70.1 1.4 21.3	Ingestion Inhalation Dermal External Exposure	2.75	Arsenic Beryllium Chromium Uranium	3.9 12.7 6.5 75.9	Ingestion Inhalation Dermal	4.4 0.1 95.4	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.91. Summary of Risk Characterization for SWMU 493

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.70E-05	Chromium	12.8	Ingestion	6.5	1.18	Cobalt	30.5	Ingestion	7.8
		PCB, Total	8.1	Inhalation	14.5		Manganese	11.7	Inhalation	7.8
		Total PAH	49.5	Dermal	52.7		Nickel	42.2	Dermal	84.4
		Uranium-238	19.0	External Exposure	26.3					
Outdoor Worker - surface	1.96E-05	Chromium	8.3	Ingestion	39.9	1.46	Cobalt	45.2	Ingestion	44.9
		PCB, Total	8.2	Inhalation	9.3		Manganese	12.4	Inhalation	4.7
		Total PAH	52.5	Dermal	33.9		Nickel	27.5	Dermal	50.5
		Uranium-238	23.9	External Exposure	16.9					
Outdoor Worker - subsurface	5.06E-05	Arsenic	56.2	Ingestion	59.0	1.68	Arsenic	10.6	Ingestion	48.8
		Cesium-137	5.0	Inhalation	3.6		Cobalt	39.2	Inhalation	4.1
		Chromium	3.2	Dermal	25.9		Manganese	10.7	Dermal	47.1
		PCB, Total	3.2	External Exposure	11.5		Nickel	23.9		
		Total PAH	20.4							
		Uranium-238	9.3							

Table D6.91. Summary of Risk Characterization for SWMU 493 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Cobalt Nickel	39.2 23.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.85E-05	Chromium Cobalt-60 Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	7.3 6.6 3.9 7.0 44.0 3.6 27.2	Ingestion Inhalation Dermal External Exposure	2.03	Barium Cobalt Manganese Nickel	5.7 33.1 9.2 41.7	Ingestion Inhalation Dermal	12.7 4.2 83.1
Future Child Resident - surface	5.85E-05	Chromium Cobalt-60 Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	7.3 6.6 3.9 7.0 44.0 3.6 27.2	Ingestion Inhalation Dermal External Exposure	6.68	Aluminum Barium Cobalt Manganese Mercury Nickel Vanadium	4.9 4.3 41.6 12.7 1.8 30.7 2.1	Ingestion Inhalation Dermal	36.0 6.0 58.0
Future Teen Recreational User - surface	7.84E-06	Total PAH	70.9	Ingestion Inhalation Dermal External Exposure	1.52	Cobalt Manganese Nickel	29.6 6.7 47.1	Ingestion Inhalation Dermal	2.3 2.3 95.4

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.92. Summary of Risk Characterization for SWMU 517

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.13E-05	Chromium	14.4	Ingestion	4.4	<1	Nickel	94.6	Ingestion	1.0
		Neptunium-237	34.9	Inhalation	16.3				Inhalation	0.5
		PCB, Total	23.6	Dermal	20.3				Dermal	98.5
		Uranium-238	20.2	External Exposure	59.0					
Outdoor Worker - surface	1.15E-05	Chromium	10.5	Ingestion	30.4	<1	Nickel	94.7	Ingestion	9.1
		Neptunium-237	28.4	Inhalation	11.9				Inhalation	0.5
		PCB, Total	26.8	Dermal	14.8				Dermal	90.4
		Uranium-238	28.8	External Exposure	42.9					
Outdoor Worker - subsurface	1.15E-05	Chromium	10.5	Ingestion	30.4	<1	Nickel	74.7	Ingestion	21.0
		Neptunium-237	28.4	Inhalation	11.9				Inhalation	0.8
		PCB, Total	26.8	Dermal	14.8				Dermal	78.1
		Uranium-238	28.8	External Exposure	42.9					

Table D6.92. Summary of Risk Characterization for SWMU 517 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Nickel	74.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.59E-05	Chromium	6.9	Ingestion	6.2	<1	Nickel	94.6	Ingestion	1.7
		Cobalt-60	4.0	Inhalation	7.8				Inhalation	0.3
		Neptunium-237	43.1	Dermal	12.8				Dermal	98.0
		PCB, Total	17.0	External Exposure	73.2					
		Uranium-235	4.4							
Uranium-238	24.5									
Future Child Resident - surface	4.59E-05	Chromium	6.9	Ingestion	6.2	1.75	Nickel	94.6	Ingestion	6.6
		Cobalt-60	4.0	Inhalation	7.8				Inhalation	0.5
		Neptunium-237	43.1	Dermal	12.8				Dermal	92.9
		PCB, Total	17.0	External Exposure	73.2					
		Uranium-235	4.4							
Uranium-238	24.5									
Future Teen Recreational User - surface	3.41E-06	PCB, Total	49.0	Ingestion	2.0	<1	Nickel	94.6	Ingestion	0.3
				Inhalation	9.9				Inhalation	0.1
				Dermal	47.1				Dermal	99.6
				External Exposure	41.1					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.93. Summary of Risk Characterization for AOC 541

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI			
Current Industrial Worker - surface	5.85E-05	Chromium	2.6	Ingestion	9.4	<1	Uranium	95.0	Ingestion	17.0			
		PCB, Total	30.9	Inhalation	5.1				Inhalation	0.6			
		Total PAH	3.8	Dermal	30.2				Dermal	82.5			
		Uranium-235	4.3	External	55.3								
		Uranium-238	56.4	Exposure									
		Americium-241	0.1	Ingestion	9.4				6.27	Uranium	95.0	Ingestion	17.0
		Cesium-137	1.1	Inhalation	5.1							Inhalation	0.6
		Chromium	2.6	Dermal	30.2							Dermal	82.5
Future Industrial Worker - surface	1.04E-03	PCB, Total	30.9	External	55.3								
		Total PAH	3.8	Exposure									
		Uranium-234	0.7										
		Uranium-235	4.3										
		Uranium-238	56.4										
		Americium-241	0.3	Ingestion	50	11.41	Iron	1.0	Ingestion	66.3			
		Cesium-137	0.6	Inhalation	2.8								
		Chromium	1.4	Dermal	16.7								
Outdoor Worker - surface	1.40E-03	PCB, Total	26.7	External	30.6								
		Total PAH	3.4	Exposure									
		Uranium-234	3.6										
		Uranium-235	2.8										
		Uranium-238	61.1										
		Americium-241	0.3	Ingestion	50.2	13.37	Arsenic	1.0	Ingestion	66.3			
		Cesium-137	1.4	Inhalation	2.7								
		Chromium	0.5	Dermal	16.2								
Outdoor Worker - subsurface	1.55E-03	Chromium	1.5	External	30.9								
		PCB, Total	24.5	Exposure									
		Total PAH	4.2										
		Uranium-234	3.3										
		Uranium-235	3.2										
		Uranium-238	61.0										
		Americium-241	0.3	Ingestion	50.2	13.37	Arsenic	1.0	Ingestion	66.3			
		Chromium	1.5	External	30.9								

Table D6.93. Summary of Risk Characterization for AOC 541 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Excavation Worker - subsurface	1.94E-05	PCB, Total	24.5	See Outdoor Worker (subsurface)	4.18	4.18	Uranium	95.6	See Outdoor Worker (subsurface) for %	95.6		
		Uranium-238	61.0									
		Americium-241	0.2	Ingestion	11.9							25.3
		Cesium-137	1.3	Inhalation	2.3							0.3
		Chromium	1.2	Dermal	18.6							74.4
		Cobalt-60	0.1	External	67.1							
		Neptunium-237	0.0	Exposure								
		PCB, Total	21.9									
		Total PAH	2.8									
		Uranium-234	0.7									
Future Adult Resident - surface	4.34E-03	Uranium-235	5.1									
		Uranium-238	66.7									
		Arsenic	28.8	Ingestion	11.9	48.08		Aluminum	0.7	Ingestion	57.8	
		Cesium-137	21.7	Inhalation	2.3			Chromium	0.8	Inhalation	0.3	
		Chromium	0.3	Dermal	18.6			Iron	1.0	Dermal	41.8	
		Naphthalene	0.2	External	67.1			Nickel	0.3			
		Neptunium-237	0.8	Exposure				Uranium	96.4			
		PCB, Total	13.8					Vanadium	0.2			
		Plutonium-239/240	0.1									
		Thorium-230	0.2									
Future Teen Recreational User - surface	3.64E-04	Total PAH	10.3									
		Uranium-234	1.3									
		Uranium-235	2.8									
		Uranium-238	19.8									
		Arsenic	35.0	Ingestion	3.5	7.94		Chromium	1.8	Ingestion	5.1	
		Cesium-137	8.3	Inhalation	2.6			Uranium	94.8	Inhalation	0.2	
		PCB, Total	27.0	Dermal	60.5							
		Total PAH	20.3	External	33.4							
		Uranium-235	1.1	Exposure								
		Uranium-238	7.3									

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.94. Summary of Risk Characterization for SWMU 561, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	5.73E-06	Uranium-238	61.2	Ingestion Inhalation Dermal External Exposure	12.4 3.5 22.6 61.5	<1	*no COCs			
Future Industrial Worker - surface	1.02E-04	Arsenic Chromium Cobalt-60 PCB, Total Total PAH Uranium-235 Uranium-238	16.2 2.8 3.9 5.4 6.5 3.4 61.2	Ingestion Inhalation Dermal External Exposure	12.4 3.5 22.6 61.5	<1	Arsenic Cobalt Uranium	14.7 14.3 34.9	Ingestion Inhalation Dermal	16.2 5.7 78.1
Outdoor Worker - surface	1.56E-04	Arsenic Chromium Cobalt-60 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	25.5 1.3 1.9 4.1 5.2 1.8 1.9 58.1	Ingestion Inhalation Dermal External Exposure	57.5 1.7 11 29.8	1.26	Arsenic Cobalt Iron Uranium	19.8 14.8 12.1 36.5	Ingestion Inhalation Dermal	65.1 2.4 32.6
Outdoor Worker - subsurface	1.70E-04	Arsenic Cesium-137 Chromium Cobalt-60 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	23.1 1.3 1.3 1.7 3.6 9.4 1.8 1.8 55.9	Ingestion Inhalation Dermal External Exposure	56.1 1.6 12.5 29.8	1.39	Arsenic Cobalt Iron Uranium	17.7 13.8 11 32.8	Ingestion Inhalation Dermal	63.8 2.6 33.6

Table D6.94. Summary of Risk Characterization for SWMU 561, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.13E-06	Uranium-238	24.5	See Outdoor Worker (subsurface)	<1		Uranium	32.8	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.60E-04	Arsenic	15.3	Ingestion	16.7	1.3	Arsenic	15.9	Ingestion	24.8
		Chromium	1.2	Inhalation	1.5		Cobalt	14.6	Inhalation	2.9
		Cobalt-60	4.4	Dermal	12.9		Iron	11.9	Dermal	72.3
		PCB, Total	3.5	External Exposure	69.0		Uranium	35.9		
		Total PAH	4.4							
Future Child Resident - surface	4.60E-04	Arsenic	15.3	Ingestion	16.7	5.33	Antimony	3.2	Ingestion	56.4
		Chromium	1.2	Inhalation	1.5		Arsenic	18.9	Inhalation	3.3
		Cobalt-60	4.4	Dermal	12.9		Cobalt	14.7	Dermal	40.4
		PCB, Total	3.5	External Exposure	69.0		Iron	11.9		
		Total PAH	4.4				Manganese	7.2		
		Uranium-234	0.4				Uranium	36.1		
		Uranium-235	3.8				Vanadium	2.5		
		Uranium-238	66.9							
Future Teen Recreational User - surface	3.18E-05	Arsenic	29.4	Ingestion	5.6	<1	Arsenic	14.1	Ingestion	5.1
		PCB, Total	11.0	Inhalation	2.0		Cobalt	14.7	Inhalation	1.8
		Total PAH	13.8	Dermal	50.9		Iron	12.0	Dermal	93.2
		Uranium-238	39.1	External Exposure	41.6		Uranium	36.2		

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.95. Summary of Risk Characterization for SWMU 561, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI			
Current Industrial Worker - surface	2.31E-05	PCB, Total	21.2	Ingestion	9.9	<1	*no COCs						
		Total PAH	9.9	Inhalation	4.1								
		Uranium-235	4.3	Dermal	29.8								
		Uranium-238	57	External Exposure	56.3								
Future Industrial Worker - surface	4.13E-04	Arsenic	3.2	Ingestion	9.9	1.81	Antimony	11.7	Ingestion	15.6			
		Cesium-137	1.1	Inhalation	4.1		Cobalt				6	Inhalation	1.8
		Chromium	2.3	Dermal	29.8		Uranium				71.3	Dermal	82.6
		Cobalt-60	0.4	External Exposure	56.3								
Outdoor Worker - surface	5.66E-04	PCB, Total	21.2	Exposure		3.14							
		Total PAH	9.9										
		Uranium-234	0.5										
		Uranium-235	4.3										
		Uranium-238	57										
		Arsenic	5.5	Ingestion	51.3		Antimony				6.3	Ingestion	63.9
		Cesium-137	0.6	Inhalation	2.2		Arsenic				6.2	Inhalation	0.8
		Chromium	1.2	Dermal	16.1		Cobalt				6.3	Dermal	35.3
		Cobalt-60	0.2	External Exposure	30.4		Uranium				76.2		
		PCB, Total	17.9	Exposure									
		Total PAH	8.9										
		Uranium-234	2.5										
Uranium-235	2.8												
Uranium-238	60.3												
Outdoor Worker - subsurface	5.51E-04	Arsenic	5.5	Ingestion	51.2	3.19	Antimony	5.9	Ingestion	64			
		Cesium-137	0.6	Inhalation	2.3		Arsenic				6.0	Inhalation	0.8
		Chromium	1.4	Dermal	16.4		Cobalt				5.9	Dermal	35.2
		Cobalt-60	0.2	External Exposure	30.1		Uranium				76.0		
		PCB, Total	18.7	Exposure									
		Total PAH	8.6										
		Uranium-234	2.5										
		Uranium-235	2.7										
Uranium-238	59.7												

Table D6.95. Summary of Risk Characterization for SWMU 561, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	6.89E-06	PCB, Total	18.7	See Outdoor Worker (subsurface)	<1		Uranium	76	See Outdoor Worker (subsurface) for %		
		Uranium-238	59.7								
Future Adult Resident - surface	1.74E-03	Arsenic	3.2	Ingestion	12.9	3.36	Antimony	10.9	Ingestion	23.5	
		Cesium-137	1.4	Inhalation	1.8		Arsenic	4.8	Inhalation	0.9	
		Chromium	1.1	Dermal	18.1		Cobalt	6	Dermal	75.6	
		Cobalt-60	0.5	External	67.2		Uranium	72.5			
		PCB, Total	14.7	Exposure							
		Total PAH	7.2								
Future Child Resident - surface	1.74E-03	Uranium-234	0.5				Antimony	7.2	Ingestion	55.3	
		Uranium-235	5.2				Arsenic	5.9	Inhalation	1.1	
		Uranium-238	66.3				Chromium	1.0	Dermal	43.6	
		Arsenic	3.2	Ingestion	12.9			Cobalt	6.3		
		Chromium	1.4	Inhalation	1.8			Manganese	2		
		Cobalt-60	1.1	Dermal	18.1			Thallium	0.8		
		PCB, Total	0.5	External	67.2			Uranium	75.3		
		Total PAH	14.7	Exposure				Vanadium	0.9		
		Uranium-234	7.2								
		Uranium-235	0.5								
Future Teen Recreational User - surface	1.43E-04	Uranium-238	5.2				Antimony	13.1	Ingestion	4.7	
		Arsenic	5.1	Ingestion	3.8			Cobalt	5.9	Inhalation	0.5
		Chromium	1.2	Inhalation	2.1			Uranium	71.0	Dermal	94.8
		PCB, Total	38.4	Dermal	60						
		Total PAH	18.9	External	34.1						
		Uranium-235	2.6	Exposure							
Uranium-238	32.7										

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.96. Summary of Risk Characterization for SWMU 562, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.61E-06	Uranium-238	100.0	Ingestion	11.2	<1	*no COCs			
				Inhalation	0.3					
				Dermal						
Outdoor Worker - surface	2.33E-06	Uranium-238	100.0	External Exposure	88.5	<1	Uranium	100.0	Ingestion	67.0
				Inhalation	0.2				Inhalation	0.2
				Dermal					Dermal	32.8
Outdoor Worker - subsurface	9.15E-05	Arsenic Cesium-137 Chromium PCB, Total Uranium-235 Uranium-238	31.1 4.3 8.4 13.6 1.4 41.2	External Exposure	45.2	<1	Arsenic Uranium	29.7 65.6	Ingestion	67.0
				Ingestion	52.3				Inhalation	0.2
				Inhalation	9.1				Dermal	32.8
				Dermal	14.5					
				External Exposure	24.0					

Table D6.96. Summary of Risk Characterization for SWMU 562, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.14E-06			See Outdoor Worker (subsurface)	<1	Uranium	65.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.89E-06	Uranium-238	100.0	Ingestion Inhalation Dermal External Exposure	<1	Uranium	100.0	Ingestion Inhalation Dermal	25.9 0.2 73.9
Future Child Resident - surface	7.89E-06	Uranium-238	100.0	Ingestion Inhalation Dermal External Exposure	<1	Uranium	100.0	Ingestion Inhalation Dermal	58.7 0.2 41.1
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	Uranium	100.0	Ingestion Inhalation Dermal	5.3 0.1 94.6

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.97. Summary of Risk Characterization for SWMU 562, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.10E-05	Uranium-235 Uranium-238	6.0	Ingestion	11.1	<1	*no COCs			
			91.0	Inhalation	0.5					
				Dermal	1.9					
				External Exposure	86.5					
Future Industrial Worker - surface	3.76E-04	PCB, Total Uranium-234 Uranium-235 Uranium-238	2.2	Ingestion	11.1	<1	*no COCs			
			0.8	Inhalation	0.5					
			6.0	Dermal	1.9					
			91.0	External Exposure	86.5					
Outdoor Worker - surface	5.44E-04	PCB, Total Uranium-234 Uranium-235 Uranium-238	1.8	Ingestion	54.6	<1	*no COCs			
			3.5	Inhalation	0.2					
			3.6	Dermal	1.0					
			91.1	External Exposure	44.2					
Outdoor Worker - subsurface	5.47E-04	Cesium-137 PCB, Total Uranium-234 Uranium-235 Uranium-238	0.6	Ingestion	54.3	<1	*no COCs			
			1.8	Inhalation	0.2					
			3.4	Dermal	1.0					
			3.6	External Exposure	44.5					
			90.6							

Table D6.97. Summary of Risk Characterization for SWMU 562, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	6.84E-06	Uranium-238	90.6	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.83E-03	PCB, Total	1.4	Ingestion	9.4	<1	*no COCs			
		Uranium-234	0.6	Inhalation	0.1					
		Uranium-235	6.2	Dermal	1.0					
		Uranium-238	91.8	External Exposure	89.5					
Future Child Resident - surface	1.83E-03	PCB, Total	1.4	Ingestion	9.4	<1	*no COCs			
		Uranium-234	0.6	Inhalation	0.1					
		Uranium-235	6.2	Dermal	1.0					
		Uranium-238	91.8	External Exposure	89.5					
Future Teen Recreational User - surface	7.82E-05	PCB, Total	6.8	Ingestion	6.0	<1	*no COCs			
		Uranium-235	6.0	Inhalation	0.3					
		Uranium-238	86.8	Dermal External Exposure	6.5 87.2					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.98. Summary of Risk Characterization for SWMU 562, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	1.31E-05	Chromium PCB, Total Total PAH Uranium-238	9.7	Ingestion	8.3	<1	*no COCs				
			9.8	Inhalation	10.6						
			28.4	Dermal	34.7						
			49.0	External Exposure	46.5						
Outdoor Worker - surface	1.66E-05	PCB, Total Total PAH Uranium-238	8.9	Ingestion	46.6	<1	Uranium	96.8		Ingestion Inhalation Dermal	64.9 0.2 34.9
			27.3	Inhalation	6.2						
			56.0	Dermal	20.2						
				External Exposure	27.1						
Outdoor Worker - subsurface	1.57E-05	PCB, Total Total PAH Uranium-238	9.4	Ingestion	49.3	<1	Uranium	100.0		Ingestion Inhalation Dermal	67.0 0.2 32.8
			28.9	Inhalation	0.6						
			59.3	Dermal	21.4						
				External Exposure	28.7						

Table D6-98. Summary of Risk Characterization for SWMU 562, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure (subsurface) for %	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.11E-05	Chromium	4.8	Ingestion	12.1	<1	Uranium	93.1	Ingestion	24.2
		PCB, Total	7.4	Inhalation	5.2				Inhalation	0.2
		Total PAH	22.1	Dermal	22.7				Dermal	75.6
		Uranium-235	4.1	External Exposure	59.9					
		Uranium-238	61.6							
Future Child Resident - surface	5.11E-05	Chromium	4.8	Ingestion	12.1	<1	Uranium	96.0	Ingestion	56.4
		PCB, Total	7.4	Inhalation	5.2				Inhalation	0.2
		Total PAH	22.1	Dermal	22.7				Dermal	43.4
		Uranium-235	4.1	External Exposure	59.9					
		Uranium-238	61.6							
Future Teen Recreational User - surface	4.84E-06	Total PAH	50.6	Ingestion	3.0	<1	*no COCs			
		Uranium-238	26.3	Inhalation	5.2					
				Dermal	65.4					
				External Exposure	26.4					

There are no subsurface data available for assessment.

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.99. Summary of Risk Characterization for SWMU 562, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.86E-06	Chromium Uranium-238	54.0	Ingestion	5.1	<1	*no COCs			
			46.0	Inhalation Dermal External Exposure	54.1 40.7					
Outdoor Worker - surface	3.05E-06	Chromium Uranium-238	37.5	Ingestion	34.2	<1	*no COCs			
			62.5	Inhalation Dermal External Exposure	37.6 28.2					
Outdoor Worker - subsurface	7.47E-06	Cesium-137 Chromium Uranium-238	57.0	Ingestion	15.7	<1	*no COCs			
			15.3	Inhalation	15.4					
			27.6	Dermal External Exposure	68.9					

Table D6.99. Summary of Risk Characterization for SWMU 562, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.48E-06	Chromium Uranium-238	31.7 68.3	Ingestion Inhalation Dermal External Exposure	6.3 31.7 62.0	<1	*no COCs			
Future Child Resident - surface	9.48E-06	Chromium Uranium-238	31.7 68.3	Ingestion Inhalation Dermal External Exposure	6.3 31.7 62.0	<1	Uranium	87.5	Ingestion Inhalation Dermal	51.6 0.2 48.2
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.100. Summary of Risk Characterization for SWMU 562, EU 5

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI	
Current Industrial Worker - surface	2.85E-06	Uranium-238	72.1	Ingestion	9.8	<1	*no COCs				
				Inhalation	11.0						
				Dermal	10.7						
				External Exposure	68.5						
Future Industrial Worker - surface	5.09E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	10.0	Ingestion	9.8	<1	Uranium	91.5	Ingestion	16.0	
			9.9	Inhalation	11.0					Inhalation	0.4
			2.3	Dermal	10.7					Dermal	83.6
			4.7	External Exposure	68.5						
			72.1								
Outdoor Worker - surface	6.94E-05	Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	5.4	Ingestion	51.1	<1	Uranium	96.3	Ingestion	64.7	
			8.4	Inhalation	5.9					Inhalation	0.2
			2.1	Dermal	5.8					Dermal	35.2
			4.4	External Exposure	37.2						
			3.0								
			76.7								
Outdoor Worker - subsurface	7.27E-05	Cesium-137 Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	4.5	Ingestion	48.8	<1	Uranium	96.3	Ingestion	64.7	
			5.2	Inhalation	5.7					Inhalation	0.2
			8.1	Dermal	5.6					Dermal	35.2
			2.0	External Exposure	40.0						
			4.2								
			2.9								
73.2											

Table D6.100. Summary of Risk Characterization for SWMU 562, EU 5 (Continued)

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Uranium	96.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.23E-04	Chromium	4.4	Ingestion	10.0	<1	Uranium	92.2	Ingestion	23.9
		PCB, Total	6.7	Inhalation	4.8				Inhalation	0.2
		Total PAH	1.6	Dermal	6.3				Dermal	75.9
		Uranium-234	0.8	External Exposure	78.9					
		Uranium-235	5.4							
Uranium-238	81.0									
Future Child Resident - surface	2.23E-04	Chromium	4.4	Ingestion	10.0	1.58	Uranium	95.5	Ingestion	56.1
		PCB, Total	6.7	Inhalation	4.8				Inhalation	0.2
		Total PAH	1.6	Dermal	6.3				Dermal	43.7
		Uranium-234	0.8	External Exposure	78.9					
		Uranium-235	5.4							
Uranium-238	81.0									
Future Teen Recreational User - surface	1.27E-05	PCB, Total	25.0	Ingestion	4.6	<1	Uranium	90.3	Ingestion	4.8
		Uranium-238	57.3	Inhalation	7.9				Inhalation	0.1
				Dermal	30.0				Dermal	95.1
				External Exposure	57.5					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.101. Summary of Risk Characterization for SWMU 562, EU 6

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI
Current Industrial Worker - surface	1.30E-05	Uranium-238	91.7	Ingestion	11.2	*no COCs				
				Inhalation	0.3					
				Dermal	88.4					
Future Industrial Worker - surface	2.32E-04	Uranium-234 Uranium-235 Uranium-238	0.9	Ingestion	11.2	*no COCs				
			7.4	Inhalation	0.3					
			91.7	Dermal	88.4					
Outdoor Worker - surface	3.38E-04	Uranium-234 Uranium-235 Uranium-238	4.2	Ingestion	54.8	*no COCs				
			4.4	Inhalation	0.2					
			91.4	Dermal	45.0					
Outdoor Worker - subsurface	3.38E-04	Uranium-234 Uranium-235 Uranium-238	4.2	Ingestion	54.8	*no COCs				
			4.4	Inhalation	0.2					
			91.4	Dermal	45.0					

Table D6.101. Summary of Risk Characterization for SWMU 562, EU 6 (Continued)

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI
Excavation Worker - subsurface	4.22E-06	Uranium-238	91.4	See Outdoor Worker (subsurface)					See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.14E-03	Uranium-234 Uranium-235 Uranium-238	0.7 7.6 91.7	Ingestion Inhalation Dermal External Exposure	9.2 0.1 90.7		*no COCs			
Future Child Resident - surface	1.14E-03	Uranium-234 Uranium-235 Uranium-238	0.7 7.6 91.7	Ingestion Inhalation Dermal External Exposure	9.2 0.1 90.7		*no COCs			
Future Teen Recreational User - surface	4.61E-05	Uranium-235 Uranium-238	7.8 91.7	Ingestion Inhalation Dermal External Exposure	6.3 0.2 93.5		*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.102. Summary of Risk Characterization for SWMU 563, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.50E-05	Chromium PCB, Total Uranium-238	62.9	Ingestion	2.9	<1	*no COCs			
			26.3	Inhalation	64.8					
			10.8	Dermal	22.7					
				External Exposure	9.6					
Outdoor Worker - surface	1.39E-05	Chromium PCB, Total Uranium-238	50.3	Ingestion	22.5	<1	*no COCs			
			32.8	Inhalation	51.8					
			16.9	Dermal	18.1					
				External Exposure	7.6					
Outdoor Worker - subsurface	3.54E-05	Cesium-137 Chromium PCB, Total Uranium-238	7.1	Ingestion	28.9	<1	*no COCs			
			23.1	Inhalation	26.0					
			61.7	Dermal	34.0					
			7.1	External Exposure	11.1					

Table D6.102. Summary of Risk Characterization for SWMU 563, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.79E-05	Chromium PCB, Total Uranium-238	48.4 30.6 21.0	Ingestion 8.0 Inhalation 49.8 Dermal 23.0 External Exposure 19.1	<1	*no COCs			
Future Child Resident - surface	3.79E-05	Chromium PCB, Total Uranium-238	48.4 30.6 21.0	Ingestion 8.0 Inhalation 49.8 Dermal 23.0 External Exposure 19.1	<1	Chromium Uranium	51.0 42.0	Ingestion Inhalation Dermal	29.9 0.3 69.8
Future Teen Recreational User - surface	4.52E-06	Chromium PCB, Total	38.1 54.8	Ingestion 1.5 Inhalation 39.3 Dermal 52.6 External Exposure 6.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.103. Summary of Risk Characterization for SWMU 563, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs								
Future Industrial Worker - surface	8.39E-06	Cesium-137	89.6	Ingestion Inhalation Dermal External Exposure	1.3 0.0 98.7		*no COCs			
Outdoor Worker - surface	6.89E-06	Cesium-137 Uranium-238	81.5 18.5	Ingestion Inhalation Dermal External Exposure	11.0 0.0 89.0		*no COCs			
Outdoor Worker - subsurface	6.89E-06	Cesium-137 Uranium-238	81.5 18.5	Ingestion Inhalation Dermal External Exposure	11.0 0.0 89.0		*no COCs			

Table D6.103. Summary of Risk Characterization for SWMU 563, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)					See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.22E-05	Cesium-137 Uranium-238	89.8 10.2	Ingestion	1.0		*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.0					
Future Child Resident - surface	4.22E-05	Cesium-137 Uranium-238	89.8 10.2	Ingestion	1.0		*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.0					
Future Teen Recreational User - surface	1.75E-06	Cesium-137	90.1	Ingestion	0.7		*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.3					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.104. Summary of Risk Characterization for SWMU 564

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.90E-06	Arsenic	61.9	Ingestion	18.9	<1	*no COCs			
			4.8	Inhalation	4.8					
			58.3	Dermal	58.3					
			18.0	External Exposure	18.0					
Future Industrial Worker - surface	6.97E-05	Arsenic Cesium-137 Chromium PCB, Total Uranium-238	61.9	Ingestion	18.9	<1	Arsenic Iron	37.6 20.2	Ingestion Inhalation Dermal	18.0 0.6 81.4
			10.3	Inhalation	4.8					
			3.6	Dermal	58.3					
			14.8	External Exposure	18.0					
			7.0							
Outdoor Worker - surface	1.35E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-238	76.5	Ingestion	69.1	1.36	Arsenic Iron Thallium Uranium	47.5 19.9 11.2 7.4	Ingestion Inhalation Dermal	67.8 0.2 32.0
			4.0	Inhalation	1.8					
			1.4	Dermal	22.2					
			8.8	External Exposure	6.8					
			1.7							
			1.8							
			5.2							
Outdoor Worker - subsurface	1.36E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-238	76.3	Ingestion	69.0	1.43	Arsenic Iron Thallium Uranium	45.2 18.9 10.7 7.0	Ingestion Inhalation Dermal	67.7 0.4 32.0
			4.0	Inhalation	2.0					
			1.5	Dermal	22.2					
			8.8	External Exposure	6.9					
			1.7							
			1.8							
			5.4							

Table D6.104. Summary of Risk Characterization for SWMU 564 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.70E-06	Arsenic	76.3	See Outdoor Worker (subsurface)	<1	Arsenic	45.2	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.86E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-235 Uranium-238	63.9 12.7 1.7 10.6 0.5 0.5 1.7 8.4	Ingestion Inhalation Dermal External Exposure	1.37	Arsenic Iron Thallium Uranium	39.2 20.2 11.4 7.5	Ingestion Inhalation Dermal	26.7 0.3 73.1
Future Child Resident - surface	2.86E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-235 Uranium-238	63.9 12.7 1.7 10.6 0.5 0.5 1.7 8.4	Ingestion Inhalation Dermal External Exposure	5.70	Arsenic Beryllium Iron Mercury Nickel Thallium Uranium Vanadium	45.9 3.6 19.9 1.9 3.8 11.2 7.4 4.9	Ingestion Inhalation Dermal	59.6 0.3 40.1
Future Teen Recreational User - surface	3.39E-05	Arsenic Cesium-137 PCB, Total	71.5 4.5 19.0	Ingestion Inhalation Dermal External Exposure	<1	Arsenic Iron Thallium	34.8 20.4 11.5	Ingestion Inhalation Dermal	5.4 0.2 94.4

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.105. Summary of Risk Characterization for SWMU 567, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface	<1E-6					<1	*no COCs			

Table D6.105. Summary of Risk Characterization for SWMU 567, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.106. Summary of Risk Characterization for SWMU 567, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface							*no COCs			

Table D6.106. Summary of Risk Characterization for SWMU 567, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface				See Outdoor Worker (subsurface)				See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.107. Summary of Risk Characterization for SWMU 567, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.26E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.74E-06	Chromium Uranium-238	46.6 53.4	Ingestion Inhalation Dermal External Exposure	29.2 46.6 24.1	<1	*no COCs			

Table D6.107. Summary of Risk Characterization for SWMU 567, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.44E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.44E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.108. Summary of Risk Characterization for SWMU 567, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.16E-06	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.29E-06	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.72E-05	Arsenic	96.6	Ingestion Inhalation Dermal External Exposure	76.5 0.1 21.9 1.5	<1	Arsenic	71.0	Ingestion Inhalation Dermal	73.6 1.1 25.3

Table D6.108. Summary of Risk Characterization for SWMU 567, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.08E-06	Chromium Uranium-238	25.7 74.3	Ingestion Inhalation Dermal External Exposure	6.8 25.7 67.5	<1	*no COCs			
Future Child Resident - surface	4.08E-06	Chromium Uranium-238	25.7 74.3	Ingestion Inhalation Dermal External Exposure	6.8 25.7 67.5	<1	Aluminum	97.4	Ingestion Inhalation Dermal	54.9 4.1 41.0
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.109. Summary of Risk Characterization for SWMU 14, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.06E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.90E-05	Arsenic	58.1	Ingestion	22.3	<1	Nickel Silver	46.6	Ingestion	6.8
		Chromium	11.1	Inhalation	12.4			22.1	Inhalation	0.4
		PCB, Total Technetium-99	14.1 5.9	Dermal External Exposure	54.9 10.4			Dermal	92.8	
Outdoor Worker - surface	4.10E-05	Arsenic	64.6	Ingestion	73.4	<1	Arsenic Iron Nickel Silver Uranium	20.1	Ingestion	41.3
		Chromium	3.8	Inhalation	4.2			16.9	Inhalation	0.3
		PCB, Total	7.5	Dermal	18.8			32.0	Dermal	58.4
		Technetium-99	17.1	External Exposure	3.6			15.2		
		Uranium-238	3.5					15.1		
Outdoor Worker - subsurface	4.71E-05	Arsenic	57.6	Ingestion	69.4	2.56	Arsenic Iron Nickel Silver Uranium	6.6	Ingestion	32.3
		Chromium	3.4	Inhalation	3.9			12.3	Inhalation	0.9
		Cobalt-60	2.2	Dermal	16.7			54.5	Dermal	66.8
		PCB, Total	6.6	External Exposure	10.0			4.9		
		Technetium-99 Uranium-238	14.9 11.3					17.3		

Table D6.109. Summary of Risk Characterization for SWMU 14, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Nickel Uranium	54.5 17.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.33E-05	Americium-241 Arsenic Chromium Neptunium-237 PCB, Total Technetium-99 Uranium-238	1.6 63.6 5.6 5.4 10.7 6.4 6.7	Ingestion Inhalation Dermal External Exposure	1.24	Arsenic Iron Nickel Silver Uranium	11.0 11.5 44.9 21.4 10.2	Ingestion Inhalation Dermal	10.8 0.2 89.0
Future Child Resident - surface	7.33E-05	Americium-241 Arsenic Chromium Neptunium-237 PCB, Total Technetium-99 Uranium-238	1.6 63.6 5.6 5.4 10.7 6.4 6.7	Ingestion Inhalation Dermal External Exposure	3.79	Arsenic Iron Nickel Silver Uranium	17.6 15.4 35.5 16.9 13.8	Ingestion Inhalation Dermal	33.0 0.3 66.7
Future Teen Recreational User - surface	8.80E-06	Arsenic PCB, Total	70.4 19.0	Ingestion Inhalation Dermal External Exposure	<1	Nickel Silver	48.6 23.2	Ingestion Inhalation Dermal	1.9 0.1 98.0

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.110. Summary of Risk Characterization for SWMU 14, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.79E-06	Uranium-238	48.7	Ingestion Inhalation Dermal External Exposure	15 4 26.3 54.7	<1	*no COCs			
Future Industrial Worker - surface	6.77E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	21.5 3.3 4.2 3.1 8.4 2.5 7.5 48.7	Ingestion Inhalation Dermal External Exposure	15 4 26.3 54.7	2.37	Arsenic Iron Nickel Uranium	6.2 6.3 66.9 11.6	Ingestion Inhalation Dermal	5.3 1.8 92.9
Outdoor Worker - surface	1.15E-04	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	30.5 1.4 2.0 2.1 2.4 6.1 10.0 3.8 41.7	Ingestion Inhalation Dermal External Exposure	62.9 1.7 11.5 23.9	2.56	Arsenic Iron Nickel Uranium	5.4 8.6 10.8 50.0 19.8	Ingestion Inhalation Dermal	35.2 1.2 63.6
Outdoor Worker - subsurface	1.83E-04	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	19.4 1.0 2.8 16.9 1.9 2.6 9.3 4.1 41.9	Ingestion Inhalation Dermal External Exposure	58 1.9 15.2 24.9	3.19	Arsenic Iron Mercury Nickel Uranium	3.3 5.5 8.1 20.6 39.7 15.8	Ingestion Inhalation Dermal	30.3 0.9 68.8

Table D6.110. Summary of Risk Characterization for SWMU 14, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.28E-06			See Outdoor Worker (subsurface)		1.25	Iron Mercury Nickel Uranium	8.1 20.6 39.7 15.8	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.00E-04	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	20.6 1.4 4.8 2.0 0.6 5.8 2.2 8.5 54.1	Ingestion Inhalation Dermal External Exposure	20.9 1.7 15.2 62.2	4.12	Antimony Arsenic Iron Manganese Mercury Nickel Uranium	6.1 4.4 72.5 65.5 12.5	Ingestion Inhalation Dermal	8.6 1.0 90.5
Future Child Resident - surface	3.00E-04	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	20.6 1.4 4.8 2.0 0.6 5.8 2.2 8.5 54.1	Ingestion Inhalation Dermal External Exposure	20.9 1.7 15.2 62.2	12.04	Antimony Arsenic Iron Manganese Mercury Nickel Uranium	5.6 7.3 9.6 2.9 1.0 54.3 17.7	Ingestion Inhalation Dermal	27.4 1.5 71.0
Future Teen Recreational User - surface	2.21E-05	Arsenic PCB, Total Total PAH Uranium-235 Uranium-238	37.0 5.9 17.0 4.8 29.6	Ingestion Inhalation Dermal External Exposure	6.5 2.1 56.2 35.1	3.26	Antimony Arsenic Iron Nickel Uranium	6.4 3.3 5.8 69.8 10.6	Ingestion Inhalation Dermal	1.5 0.5 98.0

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.111. Summary of Risk Characterization for SWMU 14, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.49E-06	PCB, Total	73.9	Ingestion	10.5	<1	*no COCs			
				Inhalation	9.1					
				Dermal	79.2					
				External Exposure	1.3					
Future Industrial Worker - surface	6.23E-05	Arsenic Chromium PCB, Total	20.9 3.7 73.9	Ingestion	10.5	2.67	Iron Mercury Nickel Uranium	5.2 31.1 50.4 7.6	Ingestion Inhalation Dermal	4.3 1.2 94.5
				Inhalation	9.1					
				Dermal	79.2					
				External Exposure	1.3					
Outdoor Worker - surface	8.76E-05	Arsenic Chromium PCB, Total Uranium-238	35.7 2.0 60.9 1.5	Ingestion	52.9	2.71	Arsenic Iron Mercury Nickel Uranium	7.2 9.5 25.6 40.1 13.9	Ingestion Inhalation Dermal	30.1 0.9 69.0
				Inhalation	4.8					
				Dermal	41.7					
				External Exposure	0.7					
Outdoor Worker - subsurface	1.13E-04	Arsenic Chromium PCB, Total Uranium-234 Uranium-238	40.5 1.5 47.5 1.4 8.1	Ingestion	56.3	3.54	Arsenic Cobalt Iron Mercury Nickel Silver Uranium	8.1 8.0 9.7 19.6 35.4 2.8 10.7	Ingestion Inhalation Dermal	34.2 0.9 65.0
				Inhalation	3.8					
				Dermal	35.4					
				External Exposure	4.4					

Table D6.111. Summary of Risk Characterization for SWMU 14, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.42E-06			See Outdoor Worker (subsurface)	1.11	Iron Mercury Nickel Uranium	9.7 19.6 35.4 10.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.99E-04	Arsenic Chromium PCB, Total Uranium-238	27.6 2.3 67.9 2.2	Ingestion Inhalation Dermal External Exposure	4.64	Arsenic Iron Mercury Nickel Uranium	3.5 5.7 30.7 49.5 8.3	Ingestion Inhalation Dermal	6.9 0.6 92.4
Future Child Resident - surface	1.99E-04	Arsenic Chromium PCB, Total Uranium-238	27.6 2.3 67.9 2.2	Ingestion Inhalation Dermal External Exposure	12.97	Arsenic Iron Manganese Mercury Nickel Uranium	6.1 8.3 1.9 27.0 42.9 12.2	Ingestion Inhalation Dermal	23.1 1.1 75.8
Future Teen Recreational User - surface	3.68E-05	Arsenic PCB, Total	19.9 78.5	Ingestion Inhalation Dermal External Exposure	3.73	Iron Mercury Nickel Uranium	4.7 32.1 51.9 6.9	Ingestion Inhalation Dermal	1.2 0.3 98.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.112. Summary of Risk Characterization for SWMU 14, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Current Industrial Worker - surface	1.07E-05	PCB, Total	18.4	Ingestion	12.5	<1	*no COCs					
		Uranium-235	10.6	Inhalation	3.0							
		Uranium-238	51.9	Dermal	23.1							
				External	61.5							
				Exposure								
Future Industrial Worker - surface	1.91E-04	Arsenic	7.0	Ingestion	12.5	2.66	Antimony		Ingestion	6.4		
		Chromium	1.2	Inhalation	3.0		Iron		Inhalation	5.8		
		Neptunium-237	5.2	Dermal	23.1		Nickel		Dermal	64.2		
		PCB, Total	18.4	External	61.5		Silver			4.1		
		Total PAH	2.2	Exposure			Uranium			13.1		
Outdoor Worker - surface	2.93E-04	Arsenic	10.9	Ingestion	57.8	2.85	Antimony		Ingestion	5.6		
		Chromium	0.6	Inhalation	1.4		Arsenic		Inhalation	7.0		
		Neptunium-237	2.8	Dermal	11.1		Iron		Dermal	10.1		
		PCB, Total	13.9	External	29.7		Nickel			48.3		
		Thorium-230	1.3	Exposure			Uranium			22.5		
Outdoor Worker - subsurface	2.49E-04	Arsenic	12.1	Ingestion	56.7	3.86	Antimony		Ingestion	3.2		
		Chromium	0.6	Inhalation	1.7		Arsenic		Inhalation	4.8		
		Neptunium-237	2.5	Dermal	15.0		Cobalt		Dermal	6.6		
		PCB, Total	20.6	External	26.7		Iron			7.4		
		Thorium-230	1.0	Exposure			Mercury			19.2		
		Total PAH	1.6				Nickel	35.6				
		Uranium-234	12.2				Uranium	16.6				
		Uranium-235	5.4									
		Uranium-238	44.1									

Table D6.112. Summary of Risk Characterization for SWMU 14, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	3.11E-06	Uranium-238	44.1	See Outdoor Worker (subsurface)	1.21	Mercury	19.2	See Outdoor Worker (subsurface) for %		
					Nickel	35.6	Uranium			
Future Adult Resident - surface	8.43E-04	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	6.7	Ingestion	15.0	4.66	Antimony	6.3	Ingestion	8.3
			0.5	Inhalation	1.2		Arsenic	3.5	Inhalation	0.2
			5.9	Dermal	13.4		Iron	6.3	Dermal	91.4
			12.3	External	70.4		Nickel	62.5		
			0.3	Exposure			Silver	4.0		
			1.5				Uranium	14.1		
			2.8							
			12.1							
Future Child Resident - surface	8.43E-04	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	6.7	Ingestion	15.0	13.44	Antimony	5.8	Ingestion	27.0
			0.5	Inhalation	1.2		Arsenic	6.0	Inhalation	0.4
			5.9	Dermal	13.4		Copper	1.4	Dermal	72.6
			12.3	External	70.4		Iron	9.0		
			0.3	Exposure			Mercury	1.7		
			1.5				Nickel	52.4		
			2.8				Silver	3.3		
			12.1				Uranium	20.1		
Future Teen Recreational User - surface	5.96E-05	Arsenic Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	12.6	Ingestion	5.2	3.71	Antimony	6.5	Ingestion	1.4
			3.5	Inhalation	1.7		Iron	5.3	Inhalation	0.1
			37.1	Dermal	51.7		Nickel	66.2	Dermal	98.5
			4.7	External	41.5		Silver	4.2		
			7.1	Exposure			Uranium	11.8		
			33.1							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.113. Summary of Risk Characterization for SWMU 14, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	5.40E-06	Uranium-238	57.4	Ingestion Inhalation Dermal External Exposure	14.6 2.5 16.7 66.1	<1	*no COCs			
Future Industrial Worker - surface	9.64E-05	Arsenic Chromium Neptunium-237 PCB, Total Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	13.6 1.6 6.7 5.5 1.0 2.1 2.9 8.7 57.4	Ingestion Inhalation Dermal External Exposure	14.6 2.5 16.7 66.1	3.19	Cobalt Iron Mercury Nickel Silver Uranium	4.2 4.9 38.1 33.8 3.7 7.7	Ingestion Inhalation Dermal	4.9 0.9 94.2
Outdoor Worker - surface	1.61E-04	Arsenic Chromium Neptunium-237 PCB, Total Technetium-99 Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	19.6 0.7 3.3 3.8 1.1 3.9 1.5 11.5 4.5 49.9	Ingestion Inhalation Dermal External Exposure	62.1 1.1 7.4 29.3	3.36	Arsenic Cobalt Iron Mercury Nickel Uranium	5.9 7.3 8.6 30.2 25.9 13.5	Ingestion Inhalation Dermal	33.1 0.6 66.3
Outdoor Worker - subsurface	1.74E-04	Arsenic Chromium Neptunium-237 PCB, Total Technetium-99 Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	17.5 0.7 3.0 27.0 0.8 2.8 1.1 8.2 3.2 35.5	Ingestion Inhalation Dermal External Exposure	56.9 2.1 19.5 21.5	3.33	Arsenic Cobalt Iron Mercury Nickel Uranium	5.7 5.8 8.7 30.5 26.2 13.6	Ingestion Inhalation Dermal	32.9 0.7 66.4

Table D6.113. Summary of Risk Characterization for SWMU 14, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.18E-06			See Outdoor Worker (subsurface)		1.04	Mercury Nickel Uranium	30.5 26.2 13.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.43E-04	Arsenic Chromium Neptunium-237 PCB, Total Technetium-99 Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	12.5 0.7 7.3 3.5 0.3 0.9 1.4 2.4 9.5 61.4	Ingestion Inhalation Dermal External Exposure	17.2 1.0 9.3 72.5	5.57	Antimony Arsenic Cobalt Iron Mercury Nickel Silver Uranium	2.8 2.9 4.5 5.3 37.4 33.0 3.7 8.3	Ingestion Inhalation Dermal	7.9 0.5 91.6
Future Child Resident - surface	4.43E-04	Arsenic Chromium Neptunium-237 PCB, Total Technetium-99 Thorium-230 Total PAH Uranium-234 Uranium-235 Uranium-238	12.5 0.7 7.3 3.5 0.3 0.9 1.4 2.4 9.5 61.4	Ingestion Inhalation Dermal External Exposure	17.2 1.0 9.3 72.5	15.91	Antimony Arsenic Cobalt Iron Manganese Mercury Nickel Silver Thallium Uranium	2.6 5.0 6.4 7.6 1.2 32.2 28.0 3.1 0.7 12.0	Ingestion Inhalation Dermal	25.7 0.8 73.5
Future Teen Recreational User - surface	2.69E-05	Arsenic PCB, Total Total PAH Uranium-235 Uranium-238	37.0 5.9 17.0 4.8 29.6	Ingestion Inhalation Dermal External Exposure	6.9 1.6 41.9 49.7	4.44	Antimony Cobalt Iron Mercury Nickel Silver Uranium	2.9 3.7 4.5 39.4 34.9 3.9 7.0	Ingestion Inhalation Dermal	1.3 0.2 98.4

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.114. Summary of Risk Characterization for SWMU 14, EU 6

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.97E-06	PCB, Total Uranium-238	30.0 33.7	Ingestion	7.9	<1	Nickel	72.4	Ingestion	4.0
				Inhalation	19.1				Inhalation	0.5
				Dermal	25.9				Dermal	95.5
				External Exposure	47.1					
Future Industrial Worker - surface	8.87E-05	Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	16.7 11.0 30.0 2.0 6.5 33.7	Ingestion	7.9	3.11	Antimony Nickel Silver Uranium	3.4 72.4 3.6 17.4	Ingestion	4.0
				Inhalation	19.1				Inhalation	0.5
				Dermal	25.9				Dermal	95.5
				External Exposure	47.1					
Outdoor Worker - surface	1.10E-04	Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	9.9 7.3 28.0 10.9 4.5 39.3	Ingestion	45.2	3.10	Antimony Nickel Uranium	3.2 58.6 32.3	Ingestion	28.7
				Inhalation	11.4				Inhalation	0.3
				Dermal	15.4				Dermal	71.0
				External Exposure	28.0					
Outdoor Worker - subsurface	1.21E-04	Arsenic Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	20.9 8.9 5.1 25.4 7.5 3.2 28.9	Ingestion	50.8	3.28	Arsenic Nickel Silver Uranium	4.8 55.3 3.3 30.4	Ingestion	31.1
				Inhalation	10.2				Inhalation	0.7
				Dermal	18.8				Dermal	68.3
				External Exposure	20.3					

Table D6.114. Summary of Risk Characterization for SWMU 14, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.52E-06			See Outdoor Worker (subsurface)		1.03	Nickel Uranium	55.3 30.4	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.39E-04	Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	8.5 14.5 23.1 2.1 8.5 43.3	Ingestion Inhalation Dermal External Exposure	10.9 9.7 17.4 62.1	5.41	Antimony Nickel Silver Uranium	3.4 71.0 3.5 18.9	Ingestion Inhalation Dermal	6.5 0.2 93.3
Future Child Resident - surface	3.39E-04	Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	8.5 14.5 23.1 2.1 8.5 43.3	Ingestion Inhalation Dermal External Exposure	10.9 9.7 17.4 62.1	14.89	Antimony Chromium Mercury Nickel Silver Uranium	3.3 1.4 1.1 62.4 3.1 28.2	Ingestion Inhalation Dermal	21.9 0.4 77.6
Future Teen Recreational User - surface	2.88E-05	Chromium Neptunium-237 PCB, Total Uranium-235 Uranium-238	9.4 7.1 58.0 4.1 20.6	Ingestion Inhalation Dermal External Exposure	3.2 10.7 55.7 30.4	4.37	Antimony Nickel Silver Uranium	3.5 74.0 3.6 15.6	Ingestion Inhalation Dermal	1.1 0.1 98.8

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.115. Summary of Risk Characterization for SWMU 14, EU 7

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	4.27E-06	PCB, Total	53.1	Ingestion	10.3	<1	Nickel	68.8	Ingestion	2.8	
				Inhalation	6.9				Inhalation	0.4	
Future Industrial Worker - surface	7.63E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	14.9	Ingestion	10.3	4.15	Mercury Nickel Uranium	20.9	Ingestion	2.8	
			2.8	Inhalation	6.9					Inhalation	0.4
			7.2	Dermal	58.1					Dermal	96.7
			53.1	External Exposure	24.8						
			1.4								
Outdoor Worker - surface	1.06E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	25.6	Ingestion	52.4	3.82	Arsenic Mercury Nickel Uranium	4.4	Ingestion	21.9	
			1.5	Inhalation	3.7				Inhalation	0.3	
Outdoor Worker - subsurface	9.90E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	4.3	Dermal	30.8	3.96	Arsenic Mercury Nickel Silver Uranium	58.1	Ingestion	21.6	
			44.1	External Exposure	13.1					Inhalation	0.6
			1.2							Dermal	77.8
			4.2								
			2.0								

Table D6.115. Summary of Risk Characterization for SWMU 14, EU 7 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.24E-06			See Outdoor Worker (subsurface)	1.24	Mercury Nickel Uranium	18.3 58.1 14.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.79E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	17.2 1.5 9.9 42.7 1.2 1.0 4.4 22.1	Ingestion Inhalation Dermal External Exposure	7.17	Arsenic Mercury Nickel Uranium	2.0 20.8 68.0 8.2	Ingestion Inhalation Dermal	4.6 0.2 95.2
Future Child Resident - surface	2.79E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	17.2 1.5 9.9 42.7 1.2 1.0 4.4 22.1	Ingestion Inhalation Dermal External Exposure	18.78	Antimony Arsenic Mercury Nickel Uranium	0.7 3.7 19.5 62.8 12.9	Ingestion Inhalation Dermal	16.4 0.4 83.2
Future Teen Recreational User - surface	3.71E-05	Arsenic Neptunium-237 PCB, Total Uranium-238	17.2 3.1 68.5 6.7	Ingestion Inhalation Dermal External Exposure	5.89	Mercury Nickel Uranium	21.2 69.7 6.7	Ingestion Inhalation Dermal	0.8 0.1 99.1

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.116. Summary of Risk Characterization for SWMU 14, EU 8

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI			
Current Industrial Worker - surface	2.69E-06	PCB, Total	55.5	Ingestion	10.9	<1	*no COCs						
				Inhalation	7.3								
Future Industrial Worker - surface	4.80E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-238	23.8	Ingestion	10.9	2.95	Mercury Nickel Uranium	29.7	Ingestion	3.5			
			3.2	Inhalation	7.3						53.2	Inhalation	0.3
			6.8	Dermal	67.4								
			55.5	External Exposure	14.3								
			2.2										
7.2													
Outdoor Worker - surface	6.90E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-238	39.8	Ingestion	54.1	2.85	Arsenic Mercury Nickel Uranium	6.0	Ingestion	26.0			
			1.6	Inhalation	3.8						25.7	Inhalation	0.3
			3.9	Dermal	34.7								
			44.7	External Exposure	7.4								
			1.9										
7.3													
Outdoor Worker - subsurface	6.82E-05	Arsenic Chromium Neptunium-237 PCB, Total Uranium-238	43.1	Ingestion	55.2	3.08	Arsenic Mercury Nickel Uranium	5.9	Ingestion	27.6			
			1.8	Inhalation	4.0						26.1	Inhalation	0.3
			3.0	Dermal	35.4								
			45.2	External Exposure	5.3								
			5.0										

Table D6.116. Summary of Risk Characterization for SWMU 14, EU 8 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury Nickel Uranium	26.1 41.1 22.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.69E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	28.5 1.7 9.6 46.2 1.9 1.8 10.1	Ingestion Inhalation Dermal External Exposure	5.12	Arsenic Mercury Nickel Silver Uranium	2.8 29.4 52.3 3.0 11.5	Ingestion Inhalation Dermal	5.7 0.2 94.1
Future Child Resident - surface	1.69E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	28.5 1.7 9.6 46.2 1.9 1.8 10.1	Ingestion Inhalation Dermal External Exposure	13.82	Antimony Arsenic Mercury Nickel Silver Uranium	0.8 5.0 26.8 46.9 2.7 17.6	Ingestion Inhalation Dermal	19.7 0.3 80.0
Future Teen Recreational User - surface	2.56E-05	Arsenic PCB, Total	25.1 65.3	Ingestion Inhalation Dermal External Exposure	4.17	Mercury Nickel Silver Uranium	30.3 54.1 3.1 9.5	Ingestion Inhalation Dermal	0.9 0.1 99.0

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.117. Summary of Risk Characterization for SWMU 14, EU 9

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	5.57E-05	Neptunium-237	4.1	Ingestion	13.1	<1	*no COCs				
		PCB, Total	3.7	Inhalation	0.9						
		Uranium-234	4.4	Dermal	5.0						
		Uranium-235	13.9	External	81.1						
		Uranium-238	71.0	Exposure							
		Arsenic	1.4	Ingestion	13.1		3.87				
Future Industrial Worker - surface	6.77E-05	Cesium-137	0.5	Inhalation	0.9		Mercury	3.2	Ingestion	7.5	
		Chromium	0.2	Dermal	5.0		Nickel	56.9	Inhalation	0.5	
		Neptunium-237	4.1	External	81.1		Uranium	35.3	Dermal	92.1	
		PCB, Total	3.7	Exposure							
		Total PAH	0.8								
		Uranium-234	4.4								
Outdoor Worker - surface	1.15E-04	Uranium-235	13.9				Arsenic	4.5	Ingestion	43.7	
		Uranium-238	71.0				Mercury	2.2	Inhalation	0.3	
		Arsenic	2.2	Ingestion	59.2		4.71	Nickel	37.8	Dermal	56.0
		Cesium-137	0.3	Inhalation	0.4			Uranium	53.8		
		Chromium	0.1	Dermal	2.3						
		Neptunium-237	2.1	External	38.1						
Outdoor Worker - subsurface	1.83E-04	PCB, Total	2.7	Exposure			Arsenic	4.4	Ingestion	43.7	
		Technetium-99	0.2				Mercury	2.2	Inhalation	0.3	
		Total PAH	0.6				4.7	Nickel	37.8	Dermal	56.0
		Uranium-234	18.8					Uranium	53.8		
		Uranium-235	7.7								
		Uranium-238	65.4								

Table D6.117. Summary of Risk Characterization for SWMU 14, EU 9 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.96E-05	Uranium-234	18.8	See Outdoor	1.47		Nickel	37.8	See Outdoor Worker (subsurface) for %	
		Uranium-235	7.7	Worker (subsurface)	53.8					
		Uranium-238	65.4							
Future Adult Resident - surface	4.76E-03	Arsenic	1.3	Ingestion	6.88		Antimony	2.0	Ingestion	11.8
		Cesium-137	0.6	Inhalation			Arsenic	2.5	Inhalation	0.2
		Chromium	0.1	Dermal			Mercury	3.1	Dermal	88.0
		Neptunium-237	4.3	External			Nickel	54.6		
		PCB, Total	2.3	Exposure			Uranium	37.5		
		Technetium-99	0.0							
		Total PAH	0.5							
		Uranium-234	3.6							
		Uranium-235	14.6							
Uranium-238	72.9									
Future Child Resident - surface	4.76E-03	Arsenic	1.3	Ingestion	21.51		Antimony	1.7	Ingestion	35.2
		Cesium-137	0.6	Inhalation			Arsenic	4.0	Inhalation	0.4
		Chromium	0.1	Dermal			Mercury	2.5	Dermal	64.5
		Neptunium-237	4.3	External			Nickel	42.3		
		PCB, Total	2.3	Exposure			Uranium	49.5		
		Technetium-99	0.0							
		Total PAH	0.5							
		Uranium-234	3.6							
		Uranium-235	14.6							
Uranium-238	72.9									
Future Teen Recreational User - surface	2.20E-04	Arsenic	3.6		5.3		Antimony	2.1	Ingestion	2.1
		Cesium-137	0.5	Ingestion			Arsenic	1.9	Inhalation	0.1
		Neptunium-237	3.8	Inhalation			Mercury	3.4	Dermal	97.8
		PCB, Total	10.4	Dermal			Nickel	59.8		
		Total PAH	2.5	External			Uranium	32.5		
		Uranium-234	2.3	Exposure						
		Uranium-235	13.1							
		Uranium-238	63.7							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.118. Summary of Risk Characterization for SWMU 14, EU 10

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	5.98E-06	PCB, Total	46.8	Ingestion	10.0	<1	Mercury	59.4	Ingestion	3.0
		Uranium-238	22.5	Inhalation	4.9		Inhalation	0.2		
				Dermal	52.1		Dermal	96.8		
				External Exposure	33.0					
				Ingestion	10.6		Ingestion	3.0		
				Inhalation	4.9		Inhalation	0.2		
Future Industrial Worker - surface	1.07E-04	Arsenic	10.6	Ingestion	10.0	4.69	Iron	2.3	Ingestion	3.0
		Chromium	1.3	Inhalation	4.9		Mercury	59.4	Inhalation	0.2
		Neptunium-237	9.1	Dermal	52.1		Nickel	29.9	Dermal	96.8
		PCB, Total	46.8	External Exposure	33.0		Uranium	5.7		
		Total PAH	4.3	Exposure						
		Uranium-234	1.2							
Outdoor Worker - surface	1.47E-04	Arsenic	18.4	Ingestion	51.6	4.38	Arsenic	3.9	Ingestion	23.2
		Chromium	0.7	Inhalation	2.6		Iron	4.6	Inhalation	0.2
		Neptunium-237	5.5	Dermal	28.0		Mercury	53.0	Dermal	76.7
		PCB, Total	39.4	External Exposure	17.8		Nickel	25.8		
		Total PAH	3.8	Exposure			Uranium	11.4		
		Uranium-234	5.8							
Outdoor Worker - subsurface	1.30E-04	Uranium-235	2.6			4.44	Arsenic	3.9	Ingestion	23.1
		Uranium-238	23.7				Iron	4.5	Inhalation	0.4
		Arsenic	21.4	Ingestion	51.6		Mercury	51.9	Dermal	76.5
		Chromium	0.8	Inhalation	3.0		Nickel	24.6		
		Neptunium-237	4.8	Dermal	31.2		Uranium	10.9		
		PCB, Total	44.3	External Exposure	14.2					

Table D6.118. Summary of Risk Characterization for SWMU 14, EU 10 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.62E-06			See Outdoor Worker (subsurface)	1.39		Mercury Nickel Uranium	51.9 24.6 10.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.06E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	11.8 0.7 12.0 36.2 3.4 1.2 5.5 29.1	Ingestion Inhalation Dermal External Exposure	18.6 2.5 35.2 43.8	8.12	Arsenic Iron Mercury Nickel Uranium	1.7 2.6 58.9 29.5 6.3	Ingestion Inhalation Dermal	4.9 0.1 95.0
Future Child Resident - surface	4.06E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	11.8 0.7 12.0 36.2 3.4 1.2 5.5 29.1	Ingestion Inhalation Dermal External Exposure	18.6 2.5 35.2 43.8	21.45	Antimony Arsenic Iron Mercury Nickel Uranium	0.8 3.2 4.0 54.8 27.0 9.8	Ingestion Inhalation Dermal	17.4 0.2 82.4
Future Teen Recreational User - surface	4.89E-05	Arsenic Neptunium-237 PCB, Total Total PAH Uranium-238	13.0 4.2 64.2 6.2 9.8	Ingestion Inhalation Dermal External Exposure	3.4 1.9 79.5 15.2	6.66	Iron Mercury Nickel Uranium	2.1 60.2 30.3 5.1	Ingestion Inhalation Dermal	0.8 0.1 99.1

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.119. Summary of Risk Characterization for SWMU 518

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.71E-05	Total PAH	99.3	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.2					
				Dermal	92.1					
Future Industrial Worker - surface	6.63E-04	PCB, Total Total PAH	0.5 99.3	Ingestion	7.6	<1	Uranium	66.2	Ingestion	15.5
				Inhalation	0.2				Inhalation	0.8
				Dermal	92.1				Dermal	83.7
Outdoor Worker - surface	8.09E-04	PCB, Total Total PAH Uranium-238	0.5 99.3 0.2	Ingestion	44.0	<1	Cobalt Uranium	22.4 71.0	Ingestion	63.8
				Inhalation	0.1				Inhalation	0.3
				Dermal	55.8				Dermal	35.8
Outdoor Worker - subsurface	8.25E-04	Arsenic PCB, Total Total PAH Uranium-238	1.9 0.5 97.4 0.2	Ingestion	44.6	<1	Cobalt Uranium	18.9 60.0	Ingestion	65.9
				Inhalation	0.1				Inhalation	0.4
				Dermal	55.2				Dermal	33.8
				External Exposure	0.1					

Table D6.119. Summary of Risk Characterization for SWMU 518 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.03E-05	Total PAH	97.4	See Outdoor Worker (subsurface)	<1	<1	Uranium	60.0	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.02E-03	Carbazole	0.1	Ingestion	22.2	2.25	Cobalt Nickel Uranium	21.2 67.1 70.1	Ingestion	23.3
		PCB, Total	0.5	Inhalation	0.1				Inhalation	0.4
		Total PAH	99.2	Derma	77.5				Derma	76.3
		Uranium-238	0.2	External Exposure	0.2					
Future Child Resident - surface	2.02E-03	Carbazole	0.1	Ingestion	22.2	2.25	Cobalt Nickel Uranium	22.2 5.5 70.1	Ingestion	55.2
		PCB, Total	0.5	Inhalation	0.1				Inhalation	0.5
		Total PAH	99.2	Derma	77.5				Derma	44.3
		Uranium-238	0.2	External Exposure	0.2					
Future Teen Recreational User - surface	4.36E-04	PCB, Total	0.5	Ingestion	2.1	<1	Uranium	65.4	Ingestion	4.6
		Total PAH	99.4	Inhalation	0.1				Inhalation	0.2
				Derma	97.8				Derma	95.2
				External Exposure	0.0					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.120. Summary of Risk Characterization for SWMU 520, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.04E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.87E-05	Cesium-137	59.9	Ingestion	5.7	2.00	Mercury	59.3	Ingestion	2.0
		Chromium	5.6	Inhalation	6.2		Nickel	30.4	Inhalation	0.2
		Neptunium-237	13.0	Dermal	2.7		Silver	6.0	Dermal	97.9
		Uranium-238	12.4	External Exposure	85.4					
Outdoor Worker - surface	2.06E-05	Cesium-137	40.5	Ingestion	36.8	1.73	Iron	6.6	Ingestion	16.3
		Neptunium-237	9.7	Inhalation	4.1		Mercury	57.0	Inhalation	0.1
		Thorium-230	25.1	Dermal	1.8		Nickel	28.3	Dermal	83.6
		Uranium-238	16.3	External Exposure	57.3					
Outdoor Worker - subsurface	4.05E-05	Arsenic	52.5	Ingestion	57.6	2.18	Arsenic	6.1	Ingestion	25.9
		Cesium-137	18.3	Inhalation	3.9		Cobalt	8.6	Inhalation	0.8
		Chromium	3.6	Dermal	12.8		Iron	5.8	Dermal	73.2
		Neptunium-237	4.0	External Exposure	25.7		Mercury	45.4		
		Thorium-230	11.5				Nickel	22.1		
		Uranium-238	7.8				Silver	4.8		

Table D6.120. Summary of Risk Characterization for SWMU 520, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Mercury Nickel	45.4 22.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.83E-05	Cesium-137 Chromium Neptunium-237 Thorium-230 Total PAH Uranium-235 Uranium-238	63.7 2.3 13.8 3.6 1.9 1.8 12.9	Ingestion Inhalation Dermal External Exposure	5.1 2.5 1.4 91.0	3.44	Iron Mercury Nickel Silver	3.4 59.1 30.1 6.0	Ingestion Inhalation Dermal	3.2 0.1 96.7
Future Child Resident - surface	8.83E-05	Cesium-137 Chromium Neptunium-237 Thorium-230 Total PAH Uranium-235 Uranium-238	63.7 2.3 13.8 3.6 1.9 1.8 12.9	Ingestion Inhalation Dermal External Exposure	5.1 2.5 1.4 91.0	8.68	Iron Mercury Nickel Silver Uranium	5.6 57.7 28.9 5.7 1.9	Ingestion Inhalation Dermal	12.0 0.2 87.9
Future Teen Recreational User - surface	4.02E-06	Cesium-137	58.3	Ingestion Inhalation Dermal External Exposure	3.0 5.1 8.6 83.2	2.87	Mercury Nickel Silver	59.6 30.5 6.1	Ingestion Inhalation Dermal	0.5 0.0 99.4

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.121. Summary of Risk Characterization for SWMU 520, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1				
Future Industrial Worker - surface	8.92E-06	Chromium	24.8	Ingestion	5.9	2.13	Mercury	62.1	Ingestion	1.7
		Total PAH	60.0	Inhalation	25.3		Nickel	34.1	Inhalation	0.8
		Uranium-238	11.7	Dermal	55.4				Dermal	97.5
				External Exposure	13.4					
Outdoor Worker - surface	9.94E-06	Chromium	16.4	Ingestion	37.5	1.80	Mercury	61.1	Ingestion	14.1
		Total PAH	65.8	Inhalation	16.8		Nickel	32.5	Inhalation	0.7
		Uranium-238	15.3	Dermal	36.8				Dermal	85.2
				External Exposure	8.9					
Outdoor Worker - subsurface	7.95E-05	Arsenic	29.9	Ingestion	30.1	1.94	Arsenic	7.6	Ingestion	19.0
		Chromium	2.1	Inhalation	2.1		Mercury	56.7	Inhalation	0.7
		Radium-226	59.5	Dermal	10.5		Nickel	30.1	Dermal	80.3
		Total PAH	6.6	External Exposure	57.3					
		Uranium-238	1.7							

Table D6.121. Summary of Risk Characterization for SWMU 520, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury Nickel	56.7 30.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.72E-05	Chromium Neptunium-237 Total PAH Uranium-238	15.8 5.1 60.0 18.9	Ingestion Inhalation Dermal External Exposure	3.64	Mercury Nickel	62.2 34.0	Ingestion Inhalation Dermal	2.7 0.4 96.8
Future Child Resident - surface	2.72E-05	Chromium Neptunium-237 Total PAH Uranium-238	15.8 5.1 60.0 18.9	Ingestion Inhalation Dermal External Exposure	9.08	Manganese Mercury Nickel Uranium	1.5 61.3 33.0 3.2	Ingestion Inhalation Dermal	10.3 0.8 88.9
Future Teen Recreational User - surface	4.20E-06	Total PAH	83.9	Ingestion Inhalation Dermal External Exposure	3.04	Mercury Nickel	62.5 34.3	Ingestion Inhalation Dermal	0.4 0.2 99.3

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.122. Summary of Risk Characterization for SWMU 520, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.26E-06	Chromium Total PAH	30.9	Ingestion	6.0	<1	Nickel Silver	80.6	Ingestion	1.6
			46.8	Inhalation	31.7			15.3	Inhalation	0.4
				Dermal External Exposure	43.2 19.2				Dermal	98.0
Outdoor Worker - surface	4.77E-06	Total PAH Uranium-238	51.1	Ingestion	37.8	<1	Nickel	77.2	Ingestion	13.5
			28.1	Inhalation	20.9			0.4	Inhalation	0.4
				Dermal External Exposure	28.6 12.7				Dermal	86.1
Outdoor Worker - subsurface	2.95E-05	Arsenic Chromium Total PAH Uranium-238	85.4	Ingestion	70.4	1.54	Arsenic Mercury Nickel	10.2	Ingestion	19.2
			5.5	Inhalation	5.6			39.9	Inhalation	0.2
			5.2	Dermal	22.3			40.4	Dermal	80.6
			3.9	External Exposure	1.7					

Table D6.122. Summary of Risk Characterization for SWMU 520, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury Nickel	39.9 40.4	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.32E-05	Chromium Total PAH Uranium-238	19.3 46.0 34.3	Ingestion Inhalation Dermal External Exposure	1.31	Nickel Silver	80.3 15.3	Ingestion Inhalation Dermal	2.6 0.2 97.1
Future Child Resident - surface	1.32E-05	Chromium Total PAH Uranium-238	19.3 46.0 34.3	Ingestion Inhalation Dermal External Exposure	3.26	Nickel Silver Uranium	78.3 14.9 4.3	Ingestion Inhalation Dermal	9.9 0.4 89.7
Future Teen Recreational User - surface	1.74E-06	Total PAH	75.4	Ingestion Inhalation Dermal External Exposure	1.10	Nickel Silver	80.9 15.5	Ingestion Inhalation Dermal	0.4 0.1 99.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.123. Summary of Risk Characterization for SWMU 520, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.76E-05	Chromium	7.2	Ingestion	6.6	1.87	Mercury	57.7	Ingestion	1.6
		Neptunium-237	15.5	Inhalation	7.5		Nickel	35.3	Inhalation	0.2
		Total PAH	52.9	Dermal	48.8				Dermal	98.3
		Uranium-238	20.9	External Exposure	37.1					
Outdoor Worker - surface	2.05E-05	Neptunium-237	11.0	Ingestion	40.4	1.57	Mercury	57.3	Ingestion	13.2
		Total PAH	55.6	Inhalation	4.8		Nickel	33.9	Inhalation	0.2
		Uranium-238	26.1	Dermal	31.1				Dermal	86.7
				External Exposure	23.7					
Outdoor Worker - subsurface	4.37E-05	Arsenic	51.6	Ingestion	58.8	1.93	Arsenic	7.3	Ingestion	23.1
		Chromium	3.7	Inhalation	3.8		Iron	6.3	Inhalation	0.7
		Neptunium-237	5.2	Dermal	26.3		Mercury	46.5	Dermal	76.2
		Total PAH	26.1	External Exposure	11.1		Nickel	27.5		
Uranium-238	12.2									

Table D6.123. Summary of Risk Characterization for SWMU 520, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury Nickel	46.5 27.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.58E-05	Chromium Neptunium-237 Total PAH Uranium-235 Uranium-238	3.7 20.8 43.2 4.7 27.5	Ingestion Inhalation Dermal External Exposure	3.20	Mercury Nickel Silver	57.7 35.1 5.2	Ingestion Inhalation Dermal	2.5 0.1 97.4
Future Child Resident - surface	6.58E-05	Chromium Neptunium-237 Total PAH Uranium-235 Uranium-238	3.7 20.8 43.2 4.7 27.5	Ingestion Inhalation Dermal External Exposure	7.91	Mercury Nickel Silver Uranium	57.4 34.3 5.1 2.2	Ingestion Inhalation Dermal	9.6 0.2 90.2
Future Teen Recreational User - surface	7.81E-06	Total PAH	78.7	Ingestion Inhalation Dermal External Exposure	2.68	Mercury Nickel Silver	57.8 35.3 5.2	Ingestion Inhalation Dermal	0.4 0.1 99.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.124. Summary of Risk Characterization for SWMU 520, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	9.20E-06	Chromium Total PAH	13.3	Ingestion	6.5	<1	Nickel	89.0	Ingestion	1.2
			71.1	Inhalation	13.6			Inhalation	0.5	
				Dermal External Exposure	65.6 14.3			Dermal	98.3	
Outdoor Worker - surface	1.06E-05	Total PAH Uranium-238	75.3	Ingestion	40.0	<1	Nickel	87.7	Ingestion	10.8
			11.7	Inhalation	8.7			Inhalation	0.4	
				Dermal External Exposure	42.1 9.2			Dermal	88.8	
Outdoor Worker - subsurface	3.49E-05	Arsenic Chromium Total PAH Uranium-238	68.8	Ingestion	65.3	1.25	Arsenic Iron Mercury Nickel	12.0	Ingestion	27.6
			3.5	Inhalation	3.6			Inhalation	0.9	
			22.9	Dermal	28.4			Dermal	71.5	
			3.5	External Exposure	2.8					

Table D6.124. Summary of Risk Characterization for SWMU 520, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	51.6	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.94E-05	Chromium Neptunium-237 Total PAH Uranium-238	8.1 9.8 67.8 14.3	Ingestion Inhalation Dermal External Exposure	<1	Nickel	88.9	Ingestion Inhalation Dermal	2.0 0.3 97.7
Future Child Resident - surface	2.94E-05	Chromium Neptunium-237 Total PAH Uranium-238	8.1 9.8 67.8 14.3	Ingestion Inhalation Dermal External Exposure	1.61	Antimony Nickel	10.8 88.1	Ingestion Inhalation Dermal	7.8 0.5 91.7
Future Teen Recreational User - surface	4.82E-06	Total PAH	89.3	Ingestion Inhalation Dermal External Exposure	<1	Nickel	89.1	Ingestion Inhalation Dermal	0.3 0.1 99.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.125. Summary of Risk Characterization for SWMU 81

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.90E-05	PCB, Total	97.3	Ingestion	6.8	<1	Uranium	83.0	Ingestion	15.0
			7.3	Inhalation	7.3			Inhalation	0.4	
			85.8	Dermal	85.8			Dermal	84.6	
			0.1	External Exposure	0.1					
Future Industrial Worker - surface	8.75E-04	Arsenic Chromium PCB, Total Total PAH Uranium-238	1.2	Ingestion	6.8	7.31	Mercury Nickel Uranium	12.7	Ingestion	15.0
			0.3	Inhalation	7.3			Inhalation	0.4	
			97.3	Dermal	85.8			Dermal	84.6	
			1.1	External Exposure	0.1					
Outdoor Worker - surface	1.03E-03	Arsenic Chromium PCB, Total Total PAH Uranium-238	2.4	Ingestion	41.1	12.39	Arsenic Mercury Nickel Uranium	1.2	Ingestion	62.9
			0.2	Inhalation	4.6			Inhalation	0.2	
			96.1	Dermal	54.2			Dermal	36.9	
			1.1	External Exposure	0.1					
Outdoor Worker - subsurface	1.03E-03	Arsenic Chromium PCB, Total Total PAH Uranium-238	2.6	Ingestion	41.2	12.76	Arsenic Cobalt Mercury Nickel Uranium	1.3	Ingestion	62.9
			0.2	Inhalation	4.5			Inhalation	0.3	
			96.0	Dermal	54.2			Dermal	36.7	
			1.0	External Exposure	0.1					
0.2	External Exposure	0.1								

Table D6.125. Summary of Risk Characterization for SWMU 81 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.28E-05	PCB, Total	96.0	See Outdoor Worker (subsurface)	3.99	Mercury Uranium	6.0 88.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.59E-03	Arsenic Chromium PCB, Total Total PAH Uranium-238	1.7 0.2 96.7 1.1 0.3	Ingestion Inhalation Dermal External Exposure	13.60	Arsenic Mercury Nickel Uranium	0.9 11.7 2.1 84.2	Ingestion Inhalation Dermal	22.6 0.2 77.2
Future Child Resident - surface	2.59E-03	Arsenic Chromium PCB, Total Total PAH Uranium-238	1.7 0.2 96.7 1.1 0.3	Ingestion Inhalation Dermal External Exposure	52.86	Aluminum Arsenic Mercury Nickel Silver Uranium	0.4 1.2 7.4 1.3 0.2 89.3	Ingestion Inhalation Dermal	54.2 0.2 45.5
Future Teen Recreational User - surface	5.47E-04	Arsenic PCB, Total Total PAH	1.1 97.7 1.1	Ingestion Inhalation Dermal External Exposure	9.42	Mercury Nickel Uranium	14.1 2.6 81.3	Ingestion Inhalation Dermal	4.4 0.1 95.5

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.126. Summary of Risk Characterization for SWMU 153

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.18E-06	PCB, Total Total PAH	64.9	Ingestion	6.9	<1	*no COCs			
			35.1	Inhalation	4.7					
				Dermal External Exposure	88.4					
Outdoor Worker - surface	4.93E-06	PCB, Total Total PAH	63.7	Ingestion	41.6	<1	*no COCs			
			36.3	Inhalation	2.9					
				Dermal External Exposure	55.5					
Outdoor Worker - subsurface	3.07E-05	Arsenic Chromium PCB, Total Total PAH	77.8	Ingestion	67.1	<1	Arsenic Nickel	34.6 34.3	Ingestion Inhalation Dermal	35.3 2.5 62.2
			5.3	Inhalation	5.9					
			12.0 4.9	Dermal External Exposure	27.0					

Table D6.126. Summary of Risk Characterization for SWMU 153 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.24E-05	PCB, Total Total PAH	64.1 35.9	Ingestion Inhalation Dermal External Exposure	20.8 3.1 76.1	<1	*no COCs			
Future Child Resident - surface	1.24E-05	PCB, Total Total PAH	64.1 35.9	Ingestion Inhalation Dermal External Exposure	20.8 3.1 76.1	<1	*no COCs			
Future Teen Recreational User - surface	2.67E-06	PCB, Total	63.8	Ingestion Inhalation Dermal External Exposure	2.0 1.3 96.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.127. Summary of Risk Characterization for SWMU 156

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	5.91E-06	Chromium PCB, Total Total PAH Uranium-238	27.5 27.0 23.6 21.8	Ingestion	6.0	1.38	Manganese Mercury Nickel	8.0	Ingestion	2.3
				Inhalation	29.6			79.6	Inhalation	4.6
				Dermal	45.1			10.4	Dermal	93.1
Outdoor Worker - surface	6.63E-06	Chromium PCB, Total Total PAH Uranium-238	18.1 27.9 25.7 28.2	Ingestion	37.9	1.22	Manganese Mercury Nickel	11.8	Ingestion	18.2
				Inhalation	19.6			75.0	Inhalation	3.8
				Dermal	29.8			9.5	Dermal	77.9
Outdoor Worker - subsurface	3.38E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	79.2 4.6 5.5 5.0 5.5	Ingestion	68.6	1.79	Arsenic Cobalt Manganese Mercury Nickel	9.3	Ingestion	31.2
				Inhalation	5.0			16.7	Inhalation	2.8
				Dermal	23.8			8.0	Dermal	66.0
				External Exposure	2.5			50.9		
				External Exposure	2.5			6.5		

Table D6.127. Summary of Risk Characterization for SWMU 156 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Mercury	50.9	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	1.84E-05	Chromium	17.1	Ingestion	2.33	Manganese	6.4	Ingestion	3.8	
		PCB, Total	25.5	Inhalation		80.8	Mercury	2.5	Inhalation	
		Total PAH	23.0	Dermal		37.1	Nickel	93.7	Dermal	
		Uranium-238	34.3	External Exposure		31.2				
Future Child Resident - surface	1.84E-05	Chromium	17.1	Ingestion	6.09	Manganese	11.1	Ingestion	13.4	
		PCB, Total	25.5	Inhalation		76.0	Mercury	4.5	Inhalation	
		Total PAH	23.0	Dermal		37.1	Nickel	82.0	Dermal	
		Uranium-238	34.3	External Exposure		31.2	Uranium			
Future Teen Recreational User - surface	2.48E-06	PCB, Total	40.5	Ingestion	1.90	Mercury	83.0	Ingestion	0.6	
				Inhalation		12.9	Nickel	1.3	Inhalation	
				Dermal		75.2			Dermal	
				External Exposure		9.7				

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.128. Summary of Risk Characterization for SWMU 160

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.09E-06	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	44.0 0.1 56.0	<1	*no COCs			
Outdoor Worker - subsurface	2.31E-05	Arsenic Chromium Total PAH	85.9 4.9 9.1	Ingestion Inhalation Dermal External Exposure	70.4 5.0 24.6	<1	Arsenic	52.1	Ingestion Inhalation Dermal	45.9 0.2 53.9

Table D6.128. Summary of Risk Characterization for SWMU 160 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.72E-06	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.72E-06	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	<1	Antimony	100.0	Ingestion Inhalation Dermal	17.6 82.4
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.129. Summary of Risk Characterization for SWMU 163

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.39E-06	Chromium Total PAH	37.3 62.7	Ingestion Inhalation Dermal External Exposure	4.7 37.4 57.9	<1	*no COCs			
Outdoor Worker - surface	4.57E-06	Chromium Total PAH	26.5 73.5	Ingestion Inhalation Dermal External Exposure	32.3 26.6 41.1	<1	*no COCs			
Outdoor Worker - subsurface	2.78E-05	Arsenic Chromium Total PAH	86.8 5.2 7.9	Ingestion Inhalation Dermal External Exposure	70.6 5.3 24.2	1.10	Arsenic Mercury Nickel	13.6 63.3 12.9	Ingestion Inhalation Dermal	22.3 0.1 77.6

Table D6.129. Summary of Risk Characterization for SWMU 163 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Mercury	63.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.16E-05	Chromium Total PAH	27.5 72.5	Ingestion Inhalation Dermal External Exposure	16.1 27.6 56.3	<1	*no COCs			
Future Child Resident - surface	1.16E-05	Chromium Total PAH	27.5 72.5	Ingestion Inhalation Dermal External Exposure	16.1 27.6 56.3	<1	*no COCs			
Future Teen Recreational User - surface	2.11E-06	Total PAH	85.9	Ingestion Inhalation Dermal External Exposure	1.8 14.2 84.0	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.130. Summary of Risk Characterization for SWMU 219

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	5.57E-06	Neptunium-237	21.9	Ingestion	7.4	<1	Nickel	100.0	Ingestion	1.0
		Total PAH	22.8	Inhalation	0.3				Inhalation	0.5
		Uranium-238	46.5	Dermal	21.0				Dermal	98.4
Outdoor Worker - surface	6.74E-06	Neptunium-237	15.0	Ingestion	43.3	<1	Nickel	100.0	Ingestion	9.2
		Total PAH	23.0	Inhalation	0.2				Inhalation	0.5
		Uranium-238	55.7	Dermal	12.8				Dermal	90.3
Outdoor Worker - subsurface	6.74E-06	Neptunium-237	15.0	Ingestion	43.3	<1	Nickel	100.0	Ingestion	9.2
		Total PAH	23.0	Inhalation	0.2				Inhalation	0.5
		Uranium-238	55.7	Dermal	12.8				Dermal	90.3
				External Exposure	43.6					
				External Exposure	43.6					

Table D6.130. Summary of Risk Characterization for SWMU 219 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	2.52E-05	Neptunium-237	24.4	Ingestion	<1	Nickel	100.0	Ingestion	1.7	
		Total PAH	15.3	Inhalation				Inhalation		0.3
		Uranium-235	9.7	Dermal				Dermal		98.0
		Uranium-238	50.5	External Exposure						
Future Child Resident - surface	2.52E-05	Neptunium-237	24.4	Ingestion	<1	Nickel	100.0	Ingestion	6.6	
		Total PAH	15.3	Inhalation				Inhalation		0.6
		Uranium-235	9.7	Dermal				Dermal		92.8
		Uranium-238	50.5	External Exposure						
Future Teen Recreational User - surface	1.71E-06	*no COCs			<1	Nickel	100.0	Ingestion Inhalation Dermal	0.3 0.1 99.6	

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D6.131. Summary of Risk Characterization for SWMU 488

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.82E-06	PCB, Total	80.5	Ingestion	6.2	<1	*no COCs			
				Inhalation	5.8					
				Dermal	75.2					
				External Exposure	12.9					
Future Industrial Worker - surface	6.82E-05	Cesium-137 PCB, Total Total PAH Uranium-238	8.9 80.5 6.2 3.9	Ingestion	6.2	<1	*no COCs			
				Inhalation	5.8					
				Dermal	75.2					
				External Exposure	12.9					
Outdoor Worker - surface	7.74E-05	Cesium-137 PCB, Total Total PAH Uranium-238	5.8 82.1 6.7 5.0	Ingestion	38.8	<1	*no COCs			
				Inhalation	3.8					
				Dermal	49.0					
				External Exposure	8.4					
Outdoor Worker - subsurface	1.00E-04	Arsenic Cesium-137 Chromium PCB, Total Total PAH Uranium-238	21.4 4.5 1.3 63.5 5.1 3.9	Ingestion	46.6	<1	Arsenic	81.5	Ingestion	73.3
				Inhalation	4.2				Inhalation	0.3
				Dermal	42.7				Dermal	26.4
				External Exposure	6.5					

Table D6.131. Summary of Risk Characterization for SWMU 488 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.25E-06			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.20E-04	Cesium-137 PCB, Total Total PAH Uranium-235 Uranium-238	13.9 73.5 5.8 0.9 6.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.20E-04	Cesium-137 PCB, Total Total PAH Uranium-235 Uranium-238	13.9 73.5 5.8 0.9 6.0	Ingestion Inhalation Dermal External Exposure	<1	Uranium	100.0	Ingestion Inhalation Dermal	58.7 0.2 41.1
Future Teen Recreational User - surface	3.91E-05	Cesium-137 PCB, Total Total PAH	3.2 88.1 7.1	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

ATTACHMENT D7
NONDETECT UNCERTAINTY EVALUATION

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D7. NONDETECT UNCERTAINTY EVALUATION

Chemicals of potential concern (COPCs) were selected for each exposure unit (EU) in each solid waste management unit (SWMU) for those analytes that were detected above background and where maximum detected value is greater than the no action level [as defined in the Risk Methods Document (DOE 2011a) for the child residential scenario]. For those analytes that never were detected within an EU, even if the detection limit is greater than the no action level, the analyte was not considered a COPC. Uncertainties are associated with this assumption. To assist in evaluating this uncertainty, the maximum detection limit was used as an exposure point concentration, and hazard index (HI) and excess lifetime cancer risk (ELCR) were calculated for the nondetected analyses. This attachment presents the results of these calculations.

Constituents with detection limits greater than the NAL and background concentrations were screened as COPCs as previously discussed in this BHHRA. The results of the screening are presented in Table D7.1. Several constituents for COPC screening did not have toxicity factors defined in Attachment D4. Those constituents and toxicity factors are listed in Table D7.2.

Chronic daily intakes (CDIs) for noncarcinogens and carcinogens are shown in Tables D7.3 and D7.4. HI and ELCR are calculated in Tables D7.5 and D7.6, respectively. These calculations showed no hazard greater than 1 and no ELCR greater than 2×10^{-6} , which is toward the bottom of the EPA risk range (EPA 1991), for the current industrial worker.

The maximum ELCR for any constituent for the current industrial worker was 1.7×10^{-6} as a result of N-Nitroso-di-n-propylamine.¹ This constituent was not detected in any of the Soils Operable Unit samples and is not expected to be present. Further, this uncertainty evaluation looked at the maximum detection limit for the constituent (2.4 mg/kg). The minimum detection limit at this exposure unit was 0.39 mg/kg, a value that would have resulted in an ELCR $< 1 \times 10^{-6}$ to the current industrial worker.

REFERENCES

- EPA 1991. *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, OSWER Directive 9355.0-30.
- HHS (U.S. Department of Health and Human Services Public Health Service National Toxicology Program) 2011. *Report on Carcinogens, Twelfth Edition*.

¹ N-Nitrosodi-n-propylamine is considered a human carcinogen. Though there are no known commercial uses of N-nitrosodi-n-propylamine, low levels have been found as a contaminant of wastewater from chemical plants (HHS 2011).

Table D7.1. Surface Soil COPCs for Nondetected Analyses

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	1	1,1,1-Trichloroethane	6.00E-03	mg/kg		1.46E+02	NoA
1	1	1,1,2,2-Tetrachloroethane	6.00E-03	mg/kg		5.62E-01	NoA
1	1	1,1,2-Trichloroethane	6.00E-03	mg/kg		2.30E-02	NoA
1	1	1,1-Dichloroethane	6.00E-03	mg/kg		1.34E+00	NoA
1	1	1,1-Dichloroethene	6.00E-03	mg/kg		2.37E-02	NoA
1	1	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
1	1	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
1	1	1,2-Dichloroethane	6.00E-03	mg/kg		1.55E-01	NoA
1	1	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
1	1	1,2-Dichloropropane	6.00E-03	mg/kg		9.40E-01	NoA
1	1	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
1	1	1,4-Dichlorobenzene	4.40E-01	mg/kg		8.13E-01	NoA
1	1	2,4,5-Trichlorophenol	2.20E+00	mg/kg		3.26E+02	NoA
1	1	2,4,6-Trichlorophenol	4.40E-01	mg/kg		3.26E+00	NoA
1	1	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
1	1	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
1	1	2,4-Dinitrophenol	2.20E+00	mg/kg		6.52E+00	NoA
1	1	2,4-Dinitrotoluene	4.40E-01	mg/kg		5.63E-01	NoA
1	1	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
1	1	2-Butanone	1.20E-02	mg/kg		5.78E+02	NoA
1	1	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA
1	1	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
1	1	2-Hexanone	1.20E-02	mg/kg		4.05E+00	NoA
1	1	2-Methyl-4,6-dinitrophenol	2.20E+00	mg/kg		2.61E-01	Yes
1	1	2-Methylnaphthalene	4.40E-01	mg/kg		1.30E+01	NoA
1	1	2-Methylphenol	4.40E-01	mg/kg		1.54E+02	NoA
1	1	2-Nitrobenzenamine	2.20E+00	mg/kg		2.96E-01	Yes
1	1	2-Nitrophenol	4.40E-01	mg/kg			NoC
1	1	3,3'-Dichlorobenzidine	8.90E-01	mg/kg		3.85E-01	Yes
1	1	3-Nitrobenzenamine	2.20E+00	mg/kg		9.78E-01	Yes
1	1	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
1	1	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
1	1	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
1	1	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
1	1	4-Methyl-2-pentanone	1.20E-02	mg/kg		1.13E+02	NoA
1	1	4-Nitrophenol	2.20E+00	mg/kg			NoC
1	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
1	1	Acenaphthylene	5.00E-01	mg/kg			NoC
1	1	Acetone	3.40E-02	mg/kg		1.34E+03	NoA
1	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
1	1	Antimony	9.65E+00	mg/kg	2.10E-01	5.52E-01	Yes
1	1	Arsenic	4.83E+00	mg/kg	1.20E+01	2.38E-01	NoB
1	1	Benzene	6.00E-03	mg/kg		3.33E-01	NoA
1	1	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
1	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
1	1	Benzoic acid	2.20E+00	mg/kg		1.30E+04	NoA
1	1	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
1	1	Bis(2-chloroethyl) ether	4.40E-01	mg/kg		2.14E-01	Yes
1	1	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	1	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
1	1	Bromodichloromethane	6.00E-03	mg/kg		2.73E-01	NoA
1	1	Bromoform	6.00E-03	mg/kg		2.19E+01	NoA
1	1	Bromomethane	1.20E-02	mg/kg		1.34E-01	NoA
1	1	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
1	1	Carbon disulfide	6.00E-03	mg/kg		1.48E+01	NoA
1	1	Carbon tetrachloride	6.00E-03	mg/kg		2.39E-01	NoA
1	1	Chlorobenzene	6.00E-03	mg/kg		4.07E+00	NoA
1	1	Chloroethane	1.20E-02	mg/kg		1.45E+03	NoA
1	1	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
1	1	Chloromethane	1.20E-02	mg/kg		1.65E+00	NoA
1	1	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
1	1	Dibenzofuran	4.40E-01	mg/kg		3.26E+00	NoA
1	1	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA
1	1	Diethyl phthalate	4.40E-01	mg/kg		2.61E+03	NoA
1	1	Dimethyl phthalate	4.40E-01	mg/kg			NoC
1	1	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
1	1	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA
1	1	Ethylbenzene	6.00E-03	mg/kg		1.58E+00	NoA
1	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
1	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
1	1	Hexachlorobenzene	4.40E-01	mg/kg		4.92E-02	Yes
1	1	Hexachlorobutadiene	4.40E-01	mg/kg		2.22E+00	NoA
1	1	Hexachlorocyclopentadiene	4.40E-01	mg/kg		1.95E+01	NoA
1	1	Hexachloroethane	4.40E-01	mg/kg		2.28E+00	NoA
1	1	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
1	1	Lead	1.93E+01	mg/kg	3.60E+01	4.00E+02	NoAB
1	1	Mercury	1.20E-01	mg/kg	2.00E-01	2.13E-01	NoAB
1	1	Methylene chloride	6.30E-02	mg/kg		3.65E+00	NoA
1	1	Molybdenum	4.83E+00	mg/kg		2.30E+01	NoA
1	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
1	1	Nitrobenzene	4.40E-01	mg/kg		4.79E+00	NoA
1	1	N-Nitroso-di-n-propylamine	4.40E-01	mg/kg		1.89E-02	Yes
1	1	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
1	1	Pentachlorophenol	2.20E+00	mg/kg		4.36E-01	Yes
1	1	Phenanthrene	5.00E-01	mg/kg			NoC
1	1	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
1	1	p-Nitroaniline	2.20E+00	mg/kg		8.66E+00	NoA
1	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
1	1	Selenium	1.93E+01	mg/kg	8.00E-01	2.30E+01	NoA
1	1	Silver	3.20E+00	mg/kg	2.30E+00	2.61E+00	Yes
1	1	Sodium	9.65E+01	mg/kg	3.20E+02		NoBE
1	1	Styrene	6.00E-03	mg/kg		9.43E+01	NoA
1	1	Tetrachloroethene	6.00E-03	mg/kg		1.13E-01	NoA
1	1	Thallium	1.93E+01	mg/kg	2.10E-01	3.68E-01	Yes
1	1	Toluene	6.00E-03	mg/kg		9.61E+01	NoA
1	1	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
1	1	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
1	1	trans-1,3-Dichloropropene	6.00E-03	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	1	Trichloroethene	6.00E-03	mg/kg		2.34E-02	NoA
1	1	Vinyl acetate	1.20E-02	mg/kg		1.83E+01	NoA
1	1	Vinyl chloride	1.20E-02	mg/kg		8.24E-02	NoA
1	2	1,1,1-Trichloroethane	7.00E-03	mg/kg		1.46E+02	NoA
1	2	1,1,2,2-Tetrachloroethane	7.00E-03	mg/kg		5.62E-01	NoA
1	2	1,1,2-Trichloroethane	7.00E-03	mg/kg		2.30E-02	NoA
1	2	1,1-Dichloroethane	7.00E-03	mg/kg		1.34E+00	NoA
1	2	1,1-Dichloroethene	7.00E-03	mg/kg		2.37E-02	NoA
1	2	1,2,4-Trichlorobenzene	4.60E-01	mg/kg		7.86E-01	NoA
1	2	1,2-Dichlorobenzene	4.60E-01	mg/kg		2.92E+01	NoA
1	2	1,2-Dichloroethane	7.00E-03	mg/kg		1.55E-01	NoA
1	2	1,2-Dichloroethene	7.00E-03	mg/kg		1.24E+00	NoA
1	2	1,2-Dichloropropane	7.00E-03	mg/kg		9.40E-01	NoA
1	2	1,3-Dichlorobenzene	4.60E-01	mg/kg			NoC
1	2	1,4-Dichlorobenzene	4.60E-01	mg/kg		8.13E-01	NoA
1	2	2,4,5-Trichlorophenol	2.30E+00	mg/kg		3.26E+02	NoA
1	2	2,4,6-Trichlorophenol	4.60E-01	mg/kg		3.26E+00	NoA
1	2	2,4-Dichlorophenol	4.60E-01	mg/kg		9.78E+00	NoA
1	2	2,4-Dimethylphenol	4.60E-01	mg/kg		6.52E+01	NoA
1	2	2,4-Dinitrophenol	2.30E+00	mg/kg		6.52E+00	NoA
1	2	2,4-Dinitrotoluene	4.60E-01	mg/kg		5.63E-01	NoA
1	2	2,6-Dinitrotoluene	4.60E-01	mg/kg		3.26E+00	NoA
1	2	2-Butanone	1.40E-02	mg/kg		5.78E+02	NoA
1	2	2-Chloronaphthalene	4.60E-01	mg/kg		6.26E+02	NoA
1	2	2-Chlorophenol	4.60E-01	mg/kg		3.91E+01	NoA
1	2	2-Hexanone	1.40E-02	mg/kg		4.05E+00	NoA
1	2	2-Methyl-4,6-dinitrophenol	2.30E+00	mg/kg		2.61E-01	Yes
1	2	2-Methylnaphthalene	4.60E-01	mg/kg		1.30E+01	NoA
1	2	2-Methylphenol	4.60E-01	mg/kg		1.54E+02	NoA
1	2	2-Nitrobenzenamine	2.30E+00	mg/kg		2.96E-01	Yes
1	2	2-Nitrophenol	4.60E-01	mg/kg			NoC
1	2	3,3'-Dichlorobenzidine	9.30E-01	mg/kg		3.85E-01	Yes
1	2	3-Nitrobenzenamine	2.30E+00	mg/kg		9.78E-01	Yes
1	2	4-Bromophenyl phenyl ether	4.60E-01	mg/kg			NoC
1	2	4-Chloro-3-methylphenol	4.60E-01	mg/kg			NoC
1	2	4-Chlorobenzenamine	4.60E-01	mg/kg		8.66E-01	NoA
1	2	4-Chlorophenyl phenyl ether	4.60E-01	mg/kg			NoC
1	2	4-Methyl-2-pentanone	1.40E-02	mg/kg		1.13E+02	NoA
1	2	4-Nitrophenol	2.30E+00	mg/kg			NoC
1	2	Acenaphthene	4.60E-01	mg/kg		1.17E+02	NoA
1	2	Acenaphthylene	4.60E-01	mg/kg			NoC
1	2	Acetone	1.00E-01	mg/kg		1.34E+03	NoA
1	2	Anthracene	4.60E-01	mg/kg		7.47E+02	NoA
1	2	Benzene	7.00E-03	mg/kg		3.33E-01	NoA
1	2	Benzenemethanol	4.60E-01	mg/kg		3.26E+02	NoA
1	2	Benzo(ghi)perylene	4.60E-01	mg/kg			NoC
1	2	Benzoic acid	2.30E+00	mg/kg		1.30E+04	NoA
1	2	Bis(2-chloroethoxy)methane	4.60E-01	mg/kg		9.78E+00	NoA
1	2	Bis(2-chloroethyl) ether	4.60E-01	mg/kg		2.14E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	2	Bis(2-chloroisopropyl) ether	4.60E-01	mg/kg		4.57E+00	NoA
1	2	Bis(2-ethylhexyl)phthalate	4.60E-01	mg/kg		1.25E+01	NoA
1	2	Bromodichloromethane	7.00E-03	mg/kg		2.73E-01	NoA
1	2	Bromoform	7.00E-03	mg/kg		2.19E+01	NoA
1	2	Bromomethane	1.40E-02	mg/kg		1.34E-01	NoA
1	2	Butyl benzyl phthalate	4.60E-01	mg/kg		9.18E+01	NoA
1	2	Carbon disulfide	7.00E-03	mg/kg		1.48E+01	NoA
1	2	Carbon tetrachloride	7.00E-03	mg/kg		2.39E-01	NoA
1	2	Chlorobenzene	7.00E-03	mg/kg		4.07E+00	NoA
1	2	Chloroethane	1.40E-02	mg/kg		1.45E+03	NoA
1	2	Chloroform	7.00E-03	mg/kg		1.22E-01	NoA
1	2	Chloromethane	1.40E-02	mg/kg		1.65E+00	NoA
1	2	cis-1,3-Dichloropropene	7.00E-03	mg/kg			NoC
1	2	Dibenzofuran	4.60E-01	mg/kg		3.26E+00	NoA
1	2	Dibromochloromethane	7.00E-03	mg/kg		2.42E-01	NoA
1	2	Diethyl phthalate	4.60E-01	mg/kg		2.61E+03	NoA
1	2	Dimethyl phthalate	4.60E-01	mg/kg			NoC
1	2	Di-n-butyl phthalate	4.60E-01	mg/kg		3.26E+02	NoA
1	2	Di-n-octylphthalate	4.60E-01	mg/kg		1.30E+02	NoA
1	2	Ethylbenzene	7.00E-03	mg/kg		1.58E+00	NoA
1	2	Fluoranthene	4.60E-01	mg/kg		1.09E+02	NoA
1	2	Fluorene	4.60E-01	mg/kg		9.15E+01	NoA
1	2	Hexachlorobenzene	4.60E-01	mg/kg		4.92E-02	Yes
1	2	Hexachlorobutadiene	4.60E-01	mg/kg		2.22E+00	NoA
1	2	Hexachlorocyclopentadiene	4.60E-01	mg/kg		1.95E+01	NoA
1	2	Hexachloroethane	4.60E-01	mg/kg		2.28E+00	NoA
1	2	Isophorone	4.60E-01	mg/kg		1.82E+02	NoA
1	2	Methylene chloride	7.00E-03	mg/kg		3.65E+00	NoA
1	2	Naphthalene	4.60E-01	mg/kg		1.15E+00	NoA
1	2	Nitrobenzene	4.60E-01	mg/kg		4.79E+00	NoA
1	2	N-Nitroso-di-n-propylamine	4.60E-01	mg/kg		1.89E-02	Yes
1	2	N-Nitrosodiphenylamine	4.60E-01	mg/kg		3.22E+01	NoA
1	2	Pentachlorophenol	2.30E+00	mg/kg		4.36E-01	Yes
1	2	Phenanthrene	4.60E-01	mg/kg			NoC
1	2	Phenol	4.60E-01	mg/kg		4.98E+02	NoA
1	2	p-Nitroaniline	2.30E+00	mg/kg		8.66E+00	NoA
1	2	Pyrene	4.60E-01	mg/kg		8.12E+01	NoA
1	2	Selenium	5.00E-01	mg/kg	8.00E-01	2.30E+01	NoAB
1	2	Sodium	5.02E+01	mg/kg	3.20E+02		NoBE
1	2	Styrene	7.00E-03	mg/kg		9.43E+01	NoA
1	2	Tetrachloroethene	7.00E-03	mg/kg		1.13E-01	NoA
1	2	Toluene	7.00E-03	mg/kg		9.61E+01	NoA
1	2	Total PAH	4.60E-01	mg/kg		1.97E-02	Yes
1	2	Total Xylene	7.00E-03	mg/kg		7.96E+00	NoA
1	2	trans-1,3-Dichloropropene	7.00E-03	mg/kg			NoC
1	2	Trichloroethene	7.00E-03	mg/kg		2.34E-02	NoA
1	2	Vinyl acetate	1.40E-02	mg/kg		1.83E+01	NoA
1	2	Vinyl chloride	1.40E-02	mg/kg		8.24E-02	NoA
1	3	1,1,1-Trichloroethane	5.00E-03	mg/kg		1.46E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	3	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
1	3	1,2,4-Trichlorobenzene	3.30E-01	mg/kg		7.86E-01	NoA
1	3	1,2-Dichlorobenzene	3.30E-01	mg/kg		2.92E+01	NoA
1	3	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
1	3	1,3-Dichlorobenzene	3.30E-01	mg/kg			NoC
1	3	1,4-Dichlorobenzene	2.30E+00	mg/kg		8.13E-01	Yes
1	3	2,4,5-Trichlorophenol	2.30E+00	mg/kg		3.26E+02	NoA
1	3	2,4,6-Trichlorophenol	2.30E+00	mg/kg		3.26E+00	NoA
1	3	2,4-Dichlorophenol	3.30E-01	mg/kg		9.78E+00	NoA
1	3	2,4-Dimethylphenol	3.30E-01	mg/kg		6.52E+01	NoA
1	3	2,4-Dinitrophenol	2.30E+00	mg/kg		6.52E+00	NoA
1	3	2,4-Dinitrotoluene	3.30E-01	mg/kg		5.63E-01	NoA
1	3	2,6-Dinitrotoluene	3.30E-01	mg/kg		3.26E+00	NoA
1	3	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
1	3	2-Chloronaphthalene	3.30E-01	mg/kg		6.26E+02	NoA
1	3	2-Chlorophenol	3.30E-01	mg/kg		3.91E+01	NoA
1	3	2-Methyl-4,6-dinitrophenol	1.65E+00	mg/kg		2.61E-01	Yes
1	3	2-Methylnaphthalene	3.30E-01	mg/kg		1.30E+01	NoA
1	3	2-Methylphenol	2.30E+00	mg/kg		1.54E+02	NoA
1	3	2-Nitrobenzenamine	1.65E+00	mg/kg		2.96E-01	Yes
1	3	2-Nitrophenol	3.30E-01	mg/kg			NoC
1	3	3,3'-Dichlorobenzidine	3.30E-01	mg/kg		3.85E-01	NoA
1	3	3-Nitrobenzenamine	1.65E+00	mg/kg		9.78E-01	Yes
1	3	4-Bromophenyl phenyl ether	3.30E-01	mg/kg			NoC
1	3	4-Chloro-3-methylphenol	3.30E-01	mg/kg			NoC
1	3	4-Chlorobenzenamine	3.30E-01	mg/kg		8.66E-01	NoA
1	3	4-Chlorophenyl phenyl ether	3.30E-01	mg/kg			NoC
1	3	4-Nitrophenol	1.65E+00	mg/kg			NoC
1	3	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
1	3	Acenaphthylene	5.00E-01	mg/kg			NoC
1	3	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
1	3	Antimony	1.50E+01	mg/kg	2.10E-01	5.52E-01	Yes
1	3	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
1	3	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
1	3	Benzenemethanol	3.30E-01	mg/kg		3.26E+02	NoA
1	3	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
1	3	Benzoic acid	1.65E+00	mg/kg		1.30E+04	NoA
1	3	Beryllium	4.60E-01	mg/kg	6.70E-01	5.67E-03	NoB
1	3	Bis(2-chloroethoxy)methane	3.30E-01	mg/kg		9.78E+00	NoA
1	3	Bis(2-chloroethyl) ether	3.30E-01	mg/kg		2.14E-01	Yes
1	3	Bis(2-chloroisopropyl) ether	3.30E-01	mg/kg		4.57E+00	NoA
1	3	Bis(2-ethylhexyl)phthalate	3.30E-01	mg/kg		1.25E+01	NoA
1	3	Butyl benzyl phthalate	3.30E-01	mg/kg		9.18E+01	NoA
1	3	Cadmium	3.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
1	3	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
1	3	Chlorobenzene	1.00E-01	mg/kg		4.07E+00	NoA
1	3	Chloroform	1.00E-02	mg/kg		1.22E-01	NoA
1	3	Dibenzofuran	3.30E-01	mg/kg		3.26E+00	NoA
1	3	Diethyl phthalate	3.30E-01	mg/kg		2.61E+03	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	3	Dimethyl phthalate	3.30E-01	mg/kg			NoC
1	3	Di-n-butyl phthalate	3.30E-01	mg/kg		3.26E+02	NoA
1	3	Di-n-octylphthalate	3.30E-01	mg/kg		1.30E+02	NoA
1	3	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
1	3	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
1	3	Hexachlorobenzene	2.30E+00	mg/kg		4.92E-02	Yes
1	3	Hexachlorobutadiene	2.30E+00	mg/kg		2.22E+00	Yes
1	3	Hexachlorocyclopentadiene	3.30E-01	mg/kg		1.95E+01	NoA
1	3	Hexachloroethane	2.30E+00	mg/kg		2.28E+00	Yes
1	3	Isophorone	3.30E-01	mg/kg		1.82E+02	NoA
1	3	Lead	1.84E+01	mg/kg	3.60E+01	4.00E+02	NoAB
1	3	m,p-Cresol	2.30E+00	mg/kg		3.91E+01	NoA
1	3	Mercury	2.00E-01	mg/kg	2.00E-01	2.13E-01	NoA
1	3	Molybdenum	4.60E+00	mg/kg		2.30E+01	NoA
1	3	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
1	3	Nickel	1.00E+01	mg/kg	2.10E+01	1.04E+01	NoAB
1	3	Nitrobenzene	2.30E+00	mg/kg		4.79E+00	NoA
1	3	N-Nitroso-di-n-propylamine	3.30E-01	mg/kg		1.89E-02	Yes
1	3	N-Nitrosodiphenylamine	3.30E-01	mg/kg		3.22E+01	NoA
1	3	Pentachlorophenol	2.30E+00	mg/kg		4.36E-01	Yes
1	3	Phenanthrene	5.00E-01	mg/kg			NoC
1	3	Phenol	3.30E-01	mg/kg		4.98E+02	NoA
1	3	p-Nitroaniline	1.65E+00	mg/kg		8.66E+00	NoA
1	3	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
1	3	Pyridine	2.30E+00	mg/kg		7.82E+00	NoA
1	3	Selenium	1.84E+01	mg/kg	8.00E-01	2.30E+01	NoA
1	3	Silver	4.00E+00	mg/kg	2.30E+00	2.61E+00	Yes
1	3	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
1	3	Thallium	2.50E+01	mg/kg	2.10E-01	3.68E-01	Yes
1	3	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
1	3	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
1	3	Vinyl chloride	1.00E-02	mg/kg		8.24E-02	NoA
1	4	1,1,1-Trichloroethane	6.00E-03	mg/kg		1.46E+02	NoA
1	4	1,1,2,2-Tetrachloroethane	6.00E-03	mg/kg		5.62E-01	NoA
1	4	1,1,2-Trichloroethane	6.00E-03	mg/kg		2.30E-02	NoA
1	4	1,1-Dichloroethane	6.00E-03	mg/kg		1.34E+00	NoA
1	4	1,1-Dichloroethene	6.00E-03	mg/kg		2.37E-02	NoA
1	4	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
1	4	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
1	4	1,2-Dichloroethane	6.00E-03	mg/kg		1.55E-01	NoA
1	4	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
1	4	1,2-Dichloropropane	6.00E-03	mg/kg		9.40E-01	NoA
1	4	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
1	4	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
1	4	2,4,5-Trichlorophenol	1.90E+00	mg/kg		3.26E+02	NoA
1	4	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
1	4	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
1	4	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
1	4	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	4	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
1	4	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
1	4	2-Butanone	1.20E-02	mg/kg		5.78E+02	NoA
1	4	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
1	4	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
1	4	2-Hexanone	1.20E-02	mg/kg		4.05E+00	NoA
1	4	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
1	4	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
1	4	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
1	4	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
1	4	2-Nitrophenol	3.90E-01	mg/kg			NoC
1	4	3,3'-Dichlorobenzidine	7.80E-01	mg/kg		3.85E-01	Yes
1	4	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
1	4	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
1	4	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
1	4	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
1	4	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
1	4	4-Methyl-2-pentanone	1.20E-02	mg/kg		1.13E+02	NoA
1	4	4-Nitrophenol	1.90E+00	mg/kg			NoC
1	4	Acenaphthene	4.80E-01	mg/kg		1.17E+02	NoA
1	4	Acenaphthylene	4.80E-01	mg/kg			NoC
1	4	Acetone	1.20E-02	mg/kg		1.34E+03	NoA
1	4	Anthracene	4.80E-01	mg/kg		7.47E+02	NoA
1	4	Antimony	1.22E+01	mg/kg	2.10E-01	5.52E-01	Yes
1	4	Arsenic	4.49E+00	mg/kg	1.20E+01	2.38E-01	NoB
1	4	Benzene	6.00E-03	mg/kg		3.33E-01	NoA
1	4	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
1	4	Benzo(ghi)perylene	4.80E-01	mg/kg			NoC
1	4	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
1	4	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
1	4	Bis(2-chloroethyl) ether	3.90E-01	mg/kg		2.14E-01	Yes
1	4	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
1	4	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
1	4	Bromodichloromethane	6.00E-03	mg/kg		2.73E-01	NoA
1	4	Bromoform	6.00E-03	mg/kg		2.19E+01	NoA
1	4	Bromomethane	1.20E-02	mg/kg		1.34E-01	NoA
1	4	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
1	4	Cadmium	1.80E+00	mg/kg	2.10E-01	8.11E-01	Yes
1	4	Carbon disulfide	6.00E-03	mg/kg		1.48E+01	NoA
1	4	Carbon tetrachloride	6.00E-03	mg/kg		2.39E-01	NoA
1	4	Chlorobenzene	6.00E-03	mg/kg		4.07E+00	NoA
1	4	Chloroethane	1.20E-02	mg/kg		1.45E+03	NoA
1	4	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
1	4	Chloromethane	1.20E-02	mg/kg		1.65E+00	NoA
1	4	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
1	4	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
1	4	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA
1	4	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
1	4	Dimethyl phthalate	3.90E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	4	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
1	4	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
1	4	Ethylbenzene	6.00E-03	mg/kg		1.58E+00	NoA
1	4	Fluoranthene	4.80E-01	mg/kg		1.09E+02	NoA
1	4	Fluorene	4.80E-01	mg/kg		9.15E+01	NoA
1	4	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
1	4	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
1	4	Hexachlorocyclopentadiene	3.90E-01	mg/kg		1.95E+01	NoA
1	4	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
1	4	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
1	4	Lead	1.80E+01	mg/kg	3.60E+01	4.00E+02	NoAB
1	4	Mercury	1.00E-01	mg/kg	2.00E-01	2.13E-01	NoAB
1	4	Methylene chloride	6.00E-03	mg/kg		3.65E+00	NoA
1	4	Molybdenum	4.49E+00	mg/kg		2.30E+01	NoA
1	4	Naphthalene	4.80E-01	mg/kg		1.15E+00	NoA
1	4	Nitrobenzene	3.90E-01	mg/kg		4.79E+00	NoA
1	4	N-Nitroso-di-n-propylamine	3.90E-01	mg/kg		1.89E-02	Yes
1	4	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
1	4	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
1	4	Phenanthrene	4.80E-01	mg/kg			NoC
1	4	Phenol	3.30E-01	mg/kg		4.98E+02	NoA
1	4	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
1	4	Pyrene	4.80E-01	mg/kg		8.12E+01	NoA
1	4	Selenium	1.80E+01	mg/kg	8.00E-01	2.30E+01	NoA
1	4	Silver	2.25E+00	mg/kg	2.30E+00	2.61E+00	NoAB
1	4	Sodium	8.98E+01	mg/kg	3.20E+02		NoBE
1	4	Styrene	6.00E-03	mg/kg		9.43E+01	NoA
1	4	Tetrachloroethene	6.00E-03	mg/kg		1.13E-01	NoA
1	4	Thallium	1.80E+01	mg/kg	2.10E-01	3.68E-01	Yes
1	4	Toluene	6.00E-03	mg/kg		9.61E+01	NoA
1	4	Total PAH	4.80E-01	mg/kg		1.97E-02	Yes
1	4	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
1	4	trans-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
1	4	Trichloroethene	6.00E-03	mg/kg		2.34E-02	NoA
1	4	Vinyl acetate	1.20E-02	mg/kg		1.83E+01	NoA
1	4	Vinyl chloride	1.20E-02	mg/kg		8.24E-02	NoA
1	5	1,1,1-Trichloroethane	6.00E-03	mg/kg		1.46E+02	NoA
1	5	1,1,2,2-Tetrachloroethane	6.00E-03	mg/kg		5.62E-01	NoA
1	5	1,1,2-Trichloroethane	6.00E-03	mg/kg		2.30E-02	NoA
1	5	1,1-Dichloroethane	6.00E-03	mg/kg		1.34E+00	NoA
1	5	1,1-Dichloroethene	6.00E-03	mg/kg		2.37E-02	NoA
1	5	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
1	5	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
1	5	1,2-Dichloroethane	6.00E-03	mg/kg		1.55E-01	NoA
1	5	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
1	5	1,2-Dichloropropane	6.00E-03	mg/kg		9.40E-01	NoA
1	5	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
1	5	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
1	5	2,4,5-Trichlorophenol	2.10E+00	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	5	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
1	5	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
1	5	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
1	5	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
1	5	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
1	5	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
1	5	2-Butanone	1.30E-02	mg/kg		5.78E+02	NoA
1	5	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
1	5	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
1	5	2-Hexanone	1.30E-02	mg/kg		4.05E+00	NoA
1	5	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
1	5	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
1	5	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
1	5	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
1	5	2-Nitrophenol	4.10E-01	mg/kg			NoC
1	5	3,3'-Dichlorobenzidine	8.20E-01	mg/kg		3.85E-01	Yes
1	5	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
1	5	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
1	5	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
1	5	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
1	5	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
1	5	4-Methyl-2-pentanone	1.30E-02	mg/kg		1.13E+02	NoA
1	5	4-Nitrophenol	2.10E+00	mg/kg			NoC
1	5	Acenaphthene	4.80E-01	mg/kg		1.17E+02	NoA
1	5	Acenaphthylene	4.80E-01	mg/kg			NoC
1	5	Acetone	5.50E-02	mg/kg		1.34E+03	NoA
1	5	Anthracene	4.80E-01	mg/kg		7.47E+02	NoA
1	5	Antimony	9.75E+00	mg/kg	2.10E-01	5.52E-01	Yes
1	5	Benzene	6.00E-03	mg/kg		3.33E-01	NoA
1	5	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
1	5	Benzo(ghi)perylene	4.80E-01	mg/kg			NoC
1	5	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
1	5	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
1	5	Bis(2-chloroethyl) ether	4.10E-01	mg/kg		2.14E-01	Yes
1	5	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
1	5	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
1	5	Bromodichloromethane	6.00E-03	mg/kg		2.73E-01	NoA
1	5	Bromoform	6.00E-03	mg/kg		2.19E+01	NoA
1	5	Bromomethane	1.30E-02	mg/kg		1.34E-01	NoA
1	5	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
1	5	Carbon disulfide	6.00E-03	mg/kg		1.48E+01	NoA
1	5	Carbon tetrachloride	6.00E-03	mg/kg		2.39E-01	NoA
1	5	Chlorobenzene	6.00E-03	mg/kg		4.07E+00	NoA
1	5	Chloroethane	1.30E-02	mg/kg		1.45E+03	NoA
1	5	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
1	5	Chloromethane	1.30E-02	mg/kg		1.65E+00	NoA
1	5	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
1	5	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
1	5	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
1	5	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
1	5	Dimethyl phthalate	4.10E-01	mg/kg			NoC
1	5	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
1	5	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
1	5	Ethylbenzene	6.00E-03	mg/kg		1.58E+00	NoA
1	5	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
1	5	Fluorene	4.80E-01	mg/kg		9.15E+01	NoA
1	5	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
1	5	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
1	5	Hexachlorocyclopentadiene	4.10E-01	mg/kg		1.95E+01	NoA
1	5	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
1	5	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
1	5	Lead	1.95E+01	mg/kg	3.60E+01	4.00E+02	NoAB
1	5	Mercury	1.30E-01	mg/kg	2.00E-01	2.13E-01	NoAB
1	5	Methylene chloride	6.00E-03	mg/kg		3.65E+00	NoA
1	5	Naphthalene	4.80E-01	mg/kg		1.15E+00	NoA
1	5	Nitrobenzene	4.10E-01	mg/kg		4.79E+00	NoA
1	5	N-Nitroso-di-n-propylamine	4.10E-01	mg/kg		1.89E-02	Yes
1	5	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
1	5	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
1	5	Phenanthrene	4.80E-01	mg/kg			NoC
1	5	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
1	5	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
1	5	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
1	5	Selenium	1.95E+01	mg/kg	8.00E-01	2.30E+01	NoA
1	5	Silver	2.44E+00	mg/kg	2.30E+00	2.61E+00	NoA
1	5	Sodium	8.15E+01	mg/kg	3.20E+02		NoBE
1	5	Styrene	6.00E-03	mg/kg		9.43E+01	NoA
1	5	Tetrachloroethene	6.00E-03	mg/kg		1.13E-01	NoA
1	5	Thallium	1.95E+01	mg/kg	2.10E-01	3.68E-01	Yes
1	5	Toluene	6.00E-03	mg/kg		9.61E+01	NoA
1	5	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
1	5	trans-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
1	5	Trichloroethene	6.00E-03	mg/kg		2.34E-02	NoA
1	5	Vinyl acetate	1.30E-02	mg/kg		1.83E+01	NoA
1	5	Vinyl chloride	1.30E-02	mg/kg		8.24E-02	NoA
99	1	1,1,1-Trichloroethane	5.00E-03	mg/kg		1.46E+02	NoA
99	1	Acenaphthene	4.80E-01	mg/kg		1.17E+02	NoA
99	1	Acenaphthylene	4.80E-01	mg/kg			NoC
99	1	Anthracene	4.80E-01	mg/kg		7.47E+02	NoA
99	1	Antimony	9.72E+00	mg/kg	2.10E-01	5.52E-01	Yes
99	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
99	1	Benzo(ghi)perylene	4.80E-01	mg/kg			NoC
99	1	Beryllium	4.86E-01	mg/kg	6.70E-01	5.67E-03	NoB
99	1	Cadmium	1.94E+00	mg/kg	2.10E-01	8.11E-01	Yes
99	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
99	1	Fluoranthene	4.80E-01	mg/kg		1.09E+02	NoA
99	1	Fluorene	4.80E-01	mg/kg		9.15E+01	NoA
99	1	Lead	1.94E+01	mg/kg	3.60E+01	4.00E+02	NoAB

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
99	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
99	1	Naphthalene	4.80E-01	mg/kg		1.15E+00	NoA
99	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
99	1	Phenanthrene	4.80E-01	mg/kg			NoC
99	1	Pyrene	4.80E-01	mg/kg		8.12E+01	NoA
99	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
99	1	Sodium	9.72E+01	mg/kg	3.20E+02		NoBE
99	1	Thallium	1.94E+01	mg/kg	2.10E-01	3.68E-01	Yes
99	1	Total PAH	4.80E-01	mg/kg		1.97E-02	Yes
99	1	Trichloroethene	5.00E-03	mg/kg		2.34E-02	NoA
99	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	1	1,2,4-Trichlorobenzene	4.30E-01	mg/kg		7.86E-01	NoA
194	1	1,2-Dichlorobenzene	4.30E-01	mg/kg		2.92E+01	NoA
194	1	1,3-Dichlorobenzene	4.30E-01	mg/kg			NoC
194	1	1,4-Dichlorobenzene	4.30E-01	mg/kg		8.13E-01	NoA
194	1	2,4,5-Trichlorophenol	4.30E-01	mg/kg		3.26E+02	NoA
194	1	2,4,6-Trichlorophenol	4.30E-01	mg/kg		3.26E+00	NoA
194	1	2,4-Dichlorophenol	4.30E-01	mg/kg		9.78E+00	NoA
194	1	2,4-Dimethylphenol	4.30E-01	mg/kg		6.52E+01	NoA
194	1	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
194	1	2,4-Dinitrotoluene	4.30E-01	mg/kg		5.63E-01	NoA
194	1	2,6-Dinitrotoluene	4.30E-01	mg/kg		3.26E+00	NoA
194	1	2-Chloronaphthalene	4.30E-01	mg/kg		6.26E+02	NoA
194	1	2-Chlorophenol	4.30E-01	mg/kg		3.91E+01	NoA
194	1	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
194	1	2-Methylnaphthalene	4.30E-01	mg/kg		1.30E+01	NoA
194	1	2-Methylphenol	4.30E-01	mg/kg		1.54E+02	NoA
194	1	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
194	1	2-Nitrophenol	4.30E-01	mg/kg			NoC
194	1	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
194	1	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
194	1	4-Bromophenyl phenyl ether	4.30E-01	mg/kg			NoC
194	1	4-Chloro-3-methylphenol	4.30E-01	mg/kg			NoC
194	1	4-Chlorobenzenamine	4.30E-01	mg/kg		8.66E-01	NoA
194	1	4-Chlorophenyl phenyl ether	4.30E-01	mg/kg			NoC
194	1	4-Nitrophenol	2.10E+00	mg/kg			NoC
194	1	Acenaphthene	4.30E-01	mg/kg		1.17E+02	NoA
194	1	Acenaphthylene	4.30E-01	mg/kg			NoC
194	1	Anthracene	4.30E-01	mg/kg		7.47E+02	NoA
194	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	1	Benzenemethanol	4.30E-01	mg/kg		3.26E+02	NoA
194	1	Benzo(ghi)perylene	4.30E-01	mg/kg			NoC
194	1	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
194	1	Bis(2-chloroethoxy)methane	4.30E-01	mg/kg		9.78E+00	NoA
194	1	Bis(2-chloroethyl) ether	8.50E-03	mg/kg		2.14E-01	NoA
194	1	Bis(2-chloroisopropyl) ether	4.30E-01	mg/kg		4.57E+00	NoA
194	1	Bis(2-ethylhexyl)phthalate	4.30E-01	mg/kg		1.25E+01	NoA
194	1	Butyl benzyl phthalate	4.30E-01	mg/kg		9.18E+01	NoA
194	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	1	Dibenzofuran	4.30E-01	mg/kg		3.26E+00	NoA
194	1	Diethyl phthalate	4.30E-01	mg/kg		2.61E+03	NoA
194	1	Dimethyl phthalate	4.30E-01	mg/kg			NoC
194	1	Di-n-butyl phthalate	4.30E-01	mg/kg		3.26E+02	NoA
194	1	Di-n-octylphthalate	4.30E-01	mg/kg		1.30E+02	NoA
194	1	Fluoranthene	4.30E-01	mg/kg		1.09E+02	NoA
194	1	Fluorene	4.30E-01	mg/kg		9.15E+01	NoA
194	1	Hexachlorobenzene	4.30E-01	mg/kg		4.92E-02	Yes
194	1	Hexachlorobutadiene	4.30E-01	mg/kg		2.22E+00	NoA
194	1	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
194	1	Hexachloroethane	4.30E-01	mg/kg		2.28E+00	NoA
194	1	Isophorone	4.30E-01	mg/kg		1.82E+02	NoA
194	1	m,p-Cresol	8.50E-01	mg/kg		3.91E+01	NoA
194	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	1	Naphthalene	4.30E-01	mg/kg		1.15E+00	NoA
194	1	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
194	1	N-Nitroso-di-n-propylamine	8.50E-03	mg/kg		1.89E-02	NoA
194	1	N-Nitrosodiphenylamine	4.30E-01	mg/kg		3.22E+01	NoA
194	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	1	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
194	1	Phenanthrene	4.30E-01	mg/kg			NoC
194	1	Phenol	4.30E-01	mg/kg		4.98E+02	NoA
194	1	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
194	1	Pyrene	4.30E-01	mg/kg		8.12E+01	NoA
194	1	Pyridine	8.50E-01	mg/kg		7.82E+00	NoA
194	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	1	Thallium	2.60E-01	mg/kg	2.10E-01	3.68E-01	NoA
194	1	Total PAH	8.50E-03	mg/kg		1.97E-02	NoA
194	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	2	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
194	2	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
194	2	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
194	2	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
194	2	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
194	2	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
194	2	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
194	2	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
194	2	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	2	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
194	2	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
194	2	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
194	2	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
194	2	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	2	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
194	2	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
194	2	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	2	2-Nitrophenol	3.90E-01	mg/kg			NoC
194	2	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	2	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	2	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	2	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
194	2	4-Chlorobenzeneamine	3.90E-01	mg/kg		8.66E-01	NoA
194	2	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	2	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	2	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
194	2	Acenaphthylene	3.90E-01	mg/kg			NoC
194	2	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
194	2	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	2	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
194	2	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC
194	2	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	2	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
194	2	Bis(2-chloroethyl) ether	7.90E-03	mg/kg		2.14E-01	NoA
194	2	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
194	2	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
194	2	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
194	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	2	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
194	2	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
194	2	Dimethyl phthalate	3.90E-01	mg/kg			NoC
194	2	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
194	2	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
194	2	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
194	2	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
194	2	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
194	2	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
194	2	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	2	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
194	2	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
194	2	m,p-Cresol	7.90E-01	mg/kg		3.91E+01	NoA
194	2	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	2	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
194	2	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	2	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	2	N-Nitroso-di-n-propylamine	7.90E-03	mg/kg		1.89E-02	NoA
194	2	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
194	2	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	2	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	2	Phenanthrene	3.90E-01	mg/kg			NoC
194	2	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
194	2	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	2	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
194	2	Pyridine	7.90E-01	mg/kg		7.82E+00	NoA
194	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	2	Thallium	2.40E-01	mg/kg	2.10E-01	3.68E-01	NoA
194	2	Total PAH	7.90E-03	mg/kg		1.97E-02	NoA
194	3	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	3	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
194	3	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
194	3	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
194	3	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
194	3	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
194	3	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
194	3	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
194	3	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	3	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
194	3	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
194	3	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
194	3	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
194	3	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	3	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
194	3	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
194	3	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	3	2-Nitrophenol	4.10E-01	mg/kg			NoC
194	3	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	3	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	3	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	3	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
194	3	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
194	3	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	3	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	3	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
194	3	Acenaphthylene	4.10E-01	mg/kg			NoC
194	3	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
194	3	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
194	3	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
194	3	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	3	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
194	3	Bis(2-chloroethyl) ether	8.20E-03	mg/kg		2.14E-01	NoA
194	3	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
194	3	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
194	3	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
194	3	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	3	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
194	3	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
194	3	Dimethyl phthalate	4.10E-01	mg/kg			NoC
194	3	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
194	3	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
194	3	Fluoranthene	4.10E-01	mg/kg		1.09E+02	NoA
194	3	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
194	3	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
194	3	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
194	3	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	3	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
194	3	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
194	3	m,p-Cresol	8.20E-01	mg/kg		3.91E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	3	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	3	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	3	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
194	3	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	3	N-Nitroso-di-n-propylamine	8.20E-03	mg/kg		1.89E-02	NoA
194	3	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
194	3	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	3	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	3	Phenanthrene	4.10E-01	mg/kg			NoC
194	3	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
194	3	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	3	Pyrene	4.10E-01	mg/kg		8.12E+01	NoA
194	3	Pyridine	8.20E-01	mg/kg		7.82E+00	NoA
194	3	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	3	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	3	Thallium	2.40E-01	mg/kg	2.10E-01	3.68E-01	NoA
194	3	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	4	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
194	4	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
194	4	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
194	4	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
194	4	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
194	4	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
194	4	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
194	4	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
194	4	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	4	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
194	4	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
194	4	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
194	4	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
194	4	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	4	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
194	4	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
194	4	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	4	2-Nitrophenol	4.10E-01	mg/kg			NoC
194	4	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	4	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	4	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	4	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
194	4	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
194	4	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	4	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	4	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
194	4	Acenaphthylene	4.10E-01	mg/kg			NoC
194	4	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
194	4	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	4	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
194	4	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
194	4	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	4	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
194	4	Bis(2-chloroethyl) ether	8.20E-03	mg/kg		2.14E-01	NoA
194	4	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
194	4	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
194	4	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
194	4	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	4	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
194	4	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
194	4	Dimethyl phthalate	4.10E-01	mg/kg			NoC
194	4	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
194	4	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
194	4	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
194	4	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
194	4	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
194	4	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	4	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
194	4	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
194	4	m,p-Cresol	8.20E-01	mg/kg		3.91E+01	NoA
194	4	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	4	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
194	4	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	4	N-Nitroso-di-n-propylamine	8.20E-03	mg/kg		1.89E-02	NoA
194	4	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
194	4	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	4	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	4	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
194	4	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	4	Pyridine	8.20E-01	mg/kg		7.82E+00	NoA
194	4	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	4	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	5	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
194	5	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
194	5	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
194	5	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
194	5	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
194	5	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
194	5	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
194	5	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
194	5	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	5	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
194	5	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
194	5	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
194	5	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
194	5	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	5	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
194	5	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
194	5	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	5	2-Nitrophenol	4.10E-01	mg/kg			NoC
194	5	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	5	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	5	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	5	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
194	5	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
194	5	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	5	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	5	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
194	5	Acenaphthylene	4.10E-01	mg/kg			NoC
194	5	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
194	5	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	5	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
194	5	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
194	5	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	5	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
194	5	Bis(2-chloroethyl) ether	8.10E-03	mg/kg		2.14E-01	NoA
194	5	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
194	5	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
194	5	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
194	5	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	5	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
194	5	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
194	5	Dimethyl phthalate	4.10E-01	mg/kg			NoC
194	5	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
194	5	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
194	5	Fluoranthene	4.10E-01	mg/kg		1.09E+02	NoA
194	5	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
194	5	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
194	5	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
194	5	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	5	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
194	5	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
194	5	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	5	m,p-Cresol	8.10E-01	mg/kg		3.91E+01	NoA
194	5	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	5	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
194	5	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	5	N-Nitroso-di-n-propylamine	8.10E-03	mg/kg		1.89E-02	NoA
194	5	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
194	5	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	5	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	5	Phenanthrene	4.10E-01	mg/kg			NoC
194	5	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
194	5	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	5	Pyrene	4.10E-01	mg/kg		8.12E+01	NoA
194	5	Pyridine	8.10E-01	mg/kg		7.82E+00	NoA
194	5	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	5	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	6	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
194	6	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	6	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
194	6	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
194	6	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
194	6	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
194	6	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
194	6	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
194	6	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	6	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
194	6	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
194	6	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
194	6	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
194	6	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	6	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
194	6	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
194	6	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	6	2-Nitrophenol	3.90E-01	mg/kg			NoC
194	6	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	6	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	6	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	6	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
194	6	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
194	6	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	6	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	6	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
194	6	Acenaphthylene	3.90E-01	mg/kg			NoC
194	6	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
194	6	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	6	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
194	6	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC
194	6	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	6	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
194	6	Bis(2-chloroethyl) ether	7.80E-03	mg/kg		2.14E-01	NoA
194	6	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
194	6	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
194	6	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
194	6	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	6	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
194	6	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
194	6	Dimethyl phthalate	3.90E-01	mg/kg			NoC
194	6	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
194	6	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
194	6	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
194	6	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
194	6	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
194	6	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
194	6	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	6	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
194	6	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
194	6	m,p-Cresol	7.80E-01	mg/kg		3.91E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	6	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	6	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	6	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
194	6	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	6	N-Nitroso-di-n-propylamine	7.80E-03	mg/kg		1.89E-02	NoA
194	6	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
194	6	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	6	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	6	Phenanthrene	3.90E-01	mg/kg			NoC
194	6	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
194	6	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	6	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
194	6	Pyridine	7.80E-01	mg/kg		7.82E+00	NoA
194	6	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	6	Thallium	2.40E-01	mg/kg	2.10E-01	3.68E-01	NoA
194	6	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	7	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
194	7	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
194	7	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
194	7	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
194	7	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
194	7	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
194	7	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
194	7	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
194	7	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	7	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
194	7	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
194	7	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
194	7	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
194	7	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	7	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
194	7	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
194	7	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	7	2-Nitrophenol	3.80E-01	mg/kg			NoC
194	7	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	7	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	7	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
194	7	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
194	7	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
194	7	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
194	7	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	7	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
194	7	Acenaphthylene	3.80E-01	mg/kg			NoC
194	7	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
194	7	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	7	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
194	7	Benzo(ghi)perylene	3.80E-01	mg/kg			NoC
194	7	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	7	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	7	Bis(2-chloroethyl) ether	7.70E-03	mg/kg		2.14E-01	NoA
194	7	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
194	7	Bis(2-ethylhexyl)phthalate	3.80E-01	mg/kg		1.25E+01	NoA
194	7	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
194	7	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	7	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
194	7	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
194	7	Dimethyl phthalate	3.80E-01	mg/kg			NoC
194	7	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
194	7	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
194	7	Fluoranthene	3.80E-01	mg/kg		1.09E+02	NoA
194	7	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
194	7	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
194	7	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
194	7	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	7	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
194	7	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
194	7	m,p-Cresol	7.70E-01	mg/kg		3.91E+01	NoA
194	7	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	7	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	7	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
194	7	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	7	N-Nitroso-di-n-propylamine	7.70E-03	mg/kg		1.89E-02	NoA
194	7	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
194	7	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	7	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	7	Phenanthrene	3.80E-01	mg/kg			NoC
194	7	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
194	7	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	7	Pyrene	3.80E-01	mg/kg		8.12E+01	NoA
194	7	Pyridine	7.70E-01	mg/kg		7.82E+00	NoA
194	7	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	7	Total PAH	7.70E-03	mg/kg		1.97E-02	NoA
194	7	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	8	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
194	8	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
194	8	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
194	8	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
194	8	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
194	8	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
194	8	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
194	8	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
194	8	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	8	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
194	8	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
194	8	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
194	8	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
194	8	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	8	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	8	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
194	8	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	8	2-Nitrophenol	4.20E-01	mg/kg			NoC
194	8	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	8	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	8	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
194	8	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
194	8	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
194	8	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
194	8	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	8	Acenaphthylene	4.20E-01	mg/kg			NoC
194	8	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	8	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
194	8	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	8	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
194	8	Bis(2-chloroethyl) ether	8.40E-03	mg/kg		2.14E-01	NoA
194	8	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
194	8	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
194	8	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	8	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
194	8	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
194	8	Dimethyl phthalate	4.20E-01	mg/kg			NoC
194	8	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
194	8	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
194	8	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	8	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
194	8	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
194	8	m,p-Cresol	8.40E-01	mg/kg		3.91E+01	NoA
194	8	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	8	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	8	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
194	8	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	8	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	8	N-Nitroso-di-n-propylamine	8.40E-03	mg/kg		1.89E-02	NoA
194	8	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
194	8	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	8	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	8	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
194	8	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	8	Pyridine	8.40E-01	mg/kg		7.82E+00	NoA
194	8	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	8	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	8	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	9	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
194	9	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
194	9	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
194	9	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
194	9	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
194	9	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	9	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
194	9	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
194	9	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	9	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
194	9	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
194	9	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
194	9	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
194	9	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	9	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
194	9	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
194	9	2-Nitrobenzamine	2.00E+00	mg/kg		2.96E-01	Yes
194	9	2-Nitrophenol	4.20E-01	mg/kg			NoC
194	9	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	9	3-Nitrobenzamine	2.00E+00	mg/kg		9.78E-01	Yes
194	9	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
194	9	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
194	9	4-Chlorobenzamine	4.20E-01	mg/kg		8.66E-01	NoA
194	9	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
194	9	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	9	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
194	9	Acenaphthylene	4.20E-01	mg/kg			NoC
194	9	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
194	9	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
194	9	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
194	9	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	9	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
194	9	Bis(2-chloroethyl) ether	8.40E-03	mg/kg		2.14E-01	NoA
194	9	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
194	9	Bis(2-ethylhexyl)phthalate	4.20E-01	mg/kg		1.25E+01	NoA
194	9	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
194	9	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	9	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
194	9	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
194	9	Dimethyl phthalate	4.20E-01	mg/kg			NoC
194	9	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
194	9	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
194	9	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
194	9	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
194	9	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
194	9	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
194	9	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	9	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
194	9	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
194	9	m,p-Cresol	8.40E-01	mg/kg		3.91E+01	NoA
194	9	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	9	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	9	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
194	9	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	9	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	9	N-Nitroso-di-n-propylamine	8.40E-03	mg/kg		1.89E-02	NoA
194	9	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
194	9	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	9	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	9	Phenanthrene	4.20E-01	mg/kg			NoC
194	9	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
194	9	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	9	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
194	9	Pyridine	8.40E-01	mg/kg		7.82E+00	NoA
194	9	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	9	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	9	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	10	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
194	10	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
194	10	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
194	10	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
194	10	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
194	10	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
194	10	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
194	10	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
194	10	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	10	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
194	10	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
194	10	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
194	10	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
194	10	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	10	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
194	10	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
194	10	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	10	2-Nitrophenol	3.80E-01	mg/kg			NoC
194	10	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	10	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	10	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
194	10	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
194	10	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
194	10	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
194	10	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	10	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
194	10	Acenaphthylene	3.80E-01	mg/kg			NoC
194	10	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
194	10	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
194	10	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	10	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
194	10	Bis(2-chloroethyl) ether	7.70E-03	mg/kg		2.14E-01	NoA
194	10	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
194	10	Bis(2-ethylhexyl)phthalate	3.80E-01	mg/kg		1.25E+01	NoA
194	10	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
194	10	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	10	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	10	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
194	10	Dimethyl phthalate	3.80E-01	mg/kg			NoC
194	10	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
194	10	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
194	10	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
194	10	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
194	10	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
194	10	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	10	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
194	10	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
194	10	m,p-Cresol	7.70E-01	mg/kg		3.91E+01	NoA
194	10	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	10	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	10	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
194	10	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	10	N-Nitroso-di-n-propylamine	7.70E-03	mg/kg		1.89E-02	NoA
194	10	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
194	10	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	10	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	10	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
194	10	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	10	Pyridine	7.70E-01	mg/kg		7.82E+00	NoA
194	10	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	10	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	10	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	11	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
194	11	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
194	11	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
194	11	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
194	11	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
194	11	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
194	11	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
194	11	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
194	11	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
194	11	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
194	11	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
194	11	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
194	11	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
194	11	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
194	11	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
194	11	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
194	11	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
194	11	2-Nitrophenol	3.60E-01	mg/kg			NoC
194	11	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
194	11	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
194	11	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
194	11	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
194	11	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
194	11	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	11	4-Nitrophenol	1.70E+00	mg/kg			NoC
194	11	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
194	11	Acenaphthylene	3.60E-01	mg/kg			NoC
194	11	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
194	11	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	11	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
194	11	Benzo(ghi)perylene	3.60E-01	mg/kg			NoC
194	11	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
194	11	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
194	11	Bis(2-chloroethyl) ether	7.20E-03	mg/kg		2.14E-01	NoA
194	11	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
194	11	Bis(2-ethylhexyl)phthalate	3.60E-01	mg/kg		1.25E+01	NoA
194	11	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
194	11	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	11	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
194	11	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
194	11	Dimethyl phthalate	3.60E-01	mg/kg			NoC
194	11	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
194	11	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
194	11	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
194	11	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
194	11	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
194	11	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
194	11	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
194	11	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
194	11	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	11	m,p-Cresol	7.20E-01	mg/kg		3.91E+01	NoA
194	11	Manganese	8.50E+01	mg/kg	1.50E+03	4.19E+02	NoAB
194	11	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	11	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
194	11	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
194	11	N-Nitroso-di-n-propylamine	7.20E-03	mg/kg		1.89E-02	NoA
194	11	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
194	11	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
194	11	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
194	11	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
194	11	Pyridine	7.20E-01	mg/kg		7.82E+00	NoA
194	11	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	11	Thallium	2.20E-01	mg/kg	2.10E-01	3.68E-01	NoA
194	11	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	12	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
194	12	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
194	12	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
194	12	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
194	12	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
194	12	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
194	12	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
194	12	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
194	12	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	12	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
194	12	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
194	12	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
194	12	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
194	12	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
194	12	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
194	12	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
194	12	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
194	12	2-Nitrophenol	3.50E-01	mg/kg			NoC
194	12	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
194	12	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
194	12	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
194	12	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
194	12	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
194	12	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
194	12	4-Nitrophenol	1.70E+00	mg/kg			NoC
194	12	Acenaphthylene	3.50E-01	mg/kg			NoC
194	12	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	12	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
194	12	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
194	12	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
194	12	Bis(2-chloroethyl) ether	7.00E-03	mg/kg		2.14E-01	NoA
194	12	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
194	12	Bis(2-ethylhexyl)phthalate	3.50E-01	mg/kg		1.25E+01	NoA
194	12	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
194	12	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	12	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
194	12	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
194	12	Dimethyl phthalate	3.50E-01	mg/kg			NoC
194	12	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
194	12	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
194	12	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
194	12	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
194	12	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
194	12	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
194	12	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
194	12	m,p-Cresol	7.00E-01	mg/kg		3.91E+01	NoA
194	12	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	12	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	12	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
194	12	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
194	12	N-Nitroso-di-n-propylamine	7.00E-03	mg/kg		1.89E-02	NoA
194	12	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
194	12	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	12	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
194	12	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
194	12	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
194	12	Pyridine	7.00E-01	mg/kg		7.82E+00	NoA
194	12	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	12	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	13	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
194	13	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA
194	13	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
194	13	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
194	13	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
194	13	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
194	13	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
194	13	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
194	13	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	13	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
194	13	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA
194	13	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
194	13	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
194	13	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	13	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
194	13	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
194	13	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	13	2-Nitrophenol	4.00E-01	mg/kg			NoC
194	13	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	13	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	13	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	13	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
194	13	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
194	13	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	13	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	13	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
194	13	Acenaphthylene	4.00E-01	mg/kg			NoC
194	13	Anthracene	4.00E-01	mg/kg		7.47E+02	NoA
194	13	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	13	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
194	13	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
194	13	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	13	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA
194	13	Bis(2-chloroethyl) ether	7.90E-03	mg/kg		2.14E-01	NoA
194	13	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
194	13	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
194	13	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	13	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
194	13	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
194	13	Dimethyl phthalate	4.00E-01	mg/kg			NoC
194	13	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
194	13	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
194	13	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
194	13	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
194	13	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
194	13	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	13	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
194	13	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	13	m,p-Cresol	7.90E-01	mg/kg		3.91E+01	NoA
194	13	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	13	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	13	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
194	13	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	13	N-Nitroso-di-n-propylamine	7.90E-03	mg/kg		1.89E-02	NoA
194	13	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
194	13	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	13	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	13	Phenanthrene	4.00E-01	mg/kg			NoC
194	13	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
194	13	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	13	Pyridine	7.90E-01	mg/kg		7.82E+00	NoA
194	13	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	13	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	13	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	14	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
194	14	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA
194	14	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
194	14	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
194	14	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
194	14	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
194	14	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
194	14	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
194	14	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	14	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
194	14	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA
194	14	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
194	14	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
194	14	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	14	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
194	14	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
194	14	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	14	2-Nitrophenol	4.00E-01	mg/kg			NoC
194	14	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	14	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	14	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	14	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
194	14	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
194	14	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	14	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	14	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
194	14	Acenaphthylene	4.00E-01	mg/kg			NoC
194	14	Anthracene	4.00E-01	mg/kg		7.47E+02	NoA
194	14	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	14	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
194	14	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
194	14	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	14	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	14	Bis(2-chloroethyl) ether	8.00E-03	mg/kg		2.14E-01	NoA
194	14	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
194	14	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
194	14	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
194	14	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	14	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
194	14	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
194	14	Dimethyl phthalate	4.00E-01	mg/kg			NoC
194	14	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
194	14	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
194	14	Fluoranthene	4.00E-01	mg/kg		1.09E+02	NoA
194	14	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
194	14	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
194	14	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
194	14	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	14	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
194	14	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA
194	14	m,p-Cresol	8.00E-01	mg/kg		3.91E+01	NoA
194	14	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	14	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
194	14	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	14	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	14	N-Nitroso-di-n-propylamine	8.00E-03	mg/kg		1.89E-02	NoA
194	14	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
194	14	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	14	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	14	Phenanthrene	4.00E-01	mg/kg			NoC
194	14	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
194	14	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	14	Pyrene	4.00E-01	mg/kg		8.12E+01	NoA
194	14	Pyridine	8.00E-01	mg/kg		7.82E+00	NoA
194	14	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	14	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	14	Total PAH	8.00E-03	mg/kg		1.97E-02	NoA
194	14	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	15	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	15	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	15	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	15	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	15	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	15	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	15	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	15	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	15	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	16	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
194	16	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
194	16	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
194	16	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
194	16	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	16	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
194	16	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
194	16	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
194	16	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	16	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
194	16	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
194	16	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
194	16	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
194	16	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	16	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
194	16	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
194	16	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	16	2-Nitrophenol	4.10E-01	mg/kg			NoC
194	16	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	16	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	16	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	16	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
194	16	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
194	16	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	16	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	16	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
194	16	Acenaphthylene	4.10E-01	mg/kg			NoC
194	16	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
194	16	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
194	16	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
194	16	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	16	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
194	16	Bis(2-chloroethyl) ether	8.20E-03	mg/kg		2.14E-01	NoA
194	16	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
194	16	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
194	16	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
194	16	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	16	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
194	16	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
194	16	Dimethyl phthalate	4.10E-01	mg/kg			NoC
194	16	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
194	16	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
194	16	Fluoranthene	4.10E-01	mg/kg		1.09E+02	NoA
194	16	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
194	16	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
194	16	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
194	16	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	16	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
194	16	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
194	16	m,p-Cresol	8.20E-01	mg/kg		3.91E+01	NoA
194	16	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	16	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	16	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
194	16	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	16	N-Nitroso-di-n-propylamine	8.20E-03	mg/kg		1.89E-02	NoA
194	16	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
194	16	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	16	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	16	Phenanthrene	4.10E-01	mg/kg			NoC
194	16	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
194	16	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	16	Pyrene	4.10E-01	mg/kg		8.12E+01	NoA
194	16	Pyridine	8.20E-01	mg/kg		7.82E+00	NoA
194	16	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	16	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	16	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	17	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
194	17	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
194	17	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
194	17	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
194	17	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
194	17	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
194	17	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
194	17	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
194	17	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
194	17	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
194	17	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
194	17	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
194	17	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
194	17	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
194	17	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
194	17	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
194	17	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
194	17	2-Nitrophenol	3.60E-01	mg/kg			NoC
194	17	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
194	17	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
194	17	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
194	17	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
194	17	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
194	17	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
194	17	4-Nitrophenol	1.70E+00	mg/kg			NoC
194	17	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
194	17	Acenaphthylene	3.60E-01	mg/kg			NoC
194	17	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
194	17	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
194	17	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
194	17	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
194	17	Bis(2-chloroethyl) ether	7.20E-03	mg/kg		2.14E-01	NoA
194	17	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
194	17	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
194	17	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	17	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
194	17	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	17	Dimethyl phthalate	3.60E-01	mg/kg			NoC
194	17	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
194	17	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
194	17	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
194	17	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
194	17	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
194	17	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
194	17	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
194	17	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
194	17	m,p-Cresol	7.20E-01	mg/kg		3.91E+01	NoA
194	17	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	17	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	17	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
194	17	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	17	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
194	17	N-Nitroso-di-n-propylamine	7.20E-03	mg/kg		1.89E-02	NoA
194	17	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
194	17	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	17	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
194	17	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
194	17	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
194	17	Pyridine	7.20E-01	mg/kg		7.82E+00	NoA
194	17	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	17	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	17	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	18	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
194	18	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA
194	18	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
194	18	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
194	18	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
194	18	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
194	18	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
194	18	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
194	18	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	18	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
194	18	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA
194	18	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
194	18	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
194	18	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	18	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
194	18	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
194	18	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	18	2-Nitrophenol	4.00E-01	mg/kg			NoC
194	18	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	18	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	18	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	18	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
194	18	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
194	18	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	18	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	18	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
194	18	Acenaphthylene	4.00E-01	mg/kg			NoC
194	18	Anthracene	4.00E-01	mg/kg		7.47E+02	NoA
194	18	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
194	18	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
194	18	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	18	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA
194	18	Bis(2-chloroethyl) ether	8.10E-03	mg/kg		2.14E-01	NoA
194	18	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
194	18	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
194	18	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
194	18	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	18	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
194	18	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
194	18	Dimethyl phthalate	4.00E-01	mg/kg			NoC
194	18	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
194	18	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
194	18	Fluoranthene	4.00E-01	mg/kg		1.09E+02	NoA
194	18	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
194	18	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
194	18	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
194	18	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	18	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
194	18	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA
194	18	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	18	m,p-Cresol	8.10E-01	mg/kg		3.91E+01	NoA
194	18	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	18	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	18	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
194	18	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	18	N-Nitroso-di-n-propylamine	8.10E-03	mg/kg		1.89E-02	NoA
194	18	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
194	18	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	18	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	18	Phenanthrene	4.00E-01	mg/kg			NoC
194	18	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
194	18	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	18	Pyrene	4.00E-01	mg/kg		8.12E+01	NoA
194	18	Pyridine	8.10E-01	mg/kg		7.82E+00	NoA
194	18	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	18	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	18	Total PAH	8.10E-03	mg/kg		1.97E-02	NoA
194	18	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	19	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
194	19	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
194	19	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
194	19	1,4-Dichlorobenzene	4.40E-01	mg/kg		8.13E-01	NoA
194	19	2,4,5-Trichlorophenol	4.40E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	19	2,4,6-Trichlorophenol	4.40E-01	mg/kg		3.26E+00	NoA
194	19	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
194	19	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
194	19	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
194	19	2,4-Dinitrotoluene	4.40E-01	mg/kg		5.63E-01	NoA
194	19	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
194	19	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA
194	19	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
194	19	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
194	19	2-Methylnaphthalene	4.40E-01	mg/kg		1.30E+01	NoA
194	19	2-Methylphenol	4.40E-01	mg/kg		1.54E+02	NoA
194	19	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
194	19	2-Nitrophenol	4.40E-01	mg/kg			NoC
194	19	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
194	19	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
194	19	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
194	19	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
194	19	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
194	19	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
194	19	4-Nitrophenol	2.10E+00	mg/kg			NoC
194	19	Acenaphthene	4.40E-01	mg/kg		1.17E+02	NoA
194	19	Acenaphthylene	4.40E-01	mg/kg			NoC
194	19	Anthracene	4.40E-01	mg/kg		7.47E+02	NoA
194	19	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
194	19	Benzo(ghi)perylene	4.40E-01	mg/kg			NoC
194	19	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
194	19	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
194	19	Bis(2-chloroethyl) ether	8.80E-03	mg/kg		2.14E-01	NoA
194	19	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA
194	19	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
194	19	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	19	Dibenzofuran	4.40E-01	mg/kg		3.26E+00	NoA
194	19	Diethyl phthalate	4.40E-01	mg/kg		2.61E+03	NoA
194	19	Dimethyl phthalate	4.40E-01	mg/kg			NoC
194	19	Di-n-butyl phthalate	4.40E-01	mg/kg		3.26E+02	NoA
194	19	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA
194	19	Fluoranthene	4.40E-01	mg/kg		1.09E+02	NoA
194	19	Fluorene	4.40E-01	mg/kg		9.15E+01	NoA
194	19	Hexachlorobenzene	4.40E-01	mg/kg		4.92E-02	Yes
194	19	Hexachlorobutadiene	4.40E-01	mg/kg		2.22E+00	NoA
194	19	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
194	19	Hexachloroethane	4.40E-01	mg/kg		2.28E+00	NoA
194	19	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
194	19	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	19	m,p-Cresol	8.80E-01	mg/kg		3.91E+01	NoA
194	19	Manganese	8.50E+01	mg/kg	1.50E+03	4.19E+02	NoAB
194	19	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	19	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	19	Naphthalene	4.40E-01	mg/kg		1.15E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	19	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
194	19	N-Nitroso-di-n-propylamine	8.80E-03	mg/kg		1.89E-02	NoA
194	19	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
194	19	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	19	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
194	19	Phenanthrene	4.40E-01	mg/kg			NoC
194	19	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
194	19	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
194	19	Pyrene	4.40E-01	mg/kg		8.12E+01	NoA
194	19	Pyridine	8.80E-01	mg/kg		7.82E+00	NoA
194	19	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	19	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	19	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	19	Zinc	2.50E+01	mg/kg	6.50E+01	1.38E+03	NoAB
194	20	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
194	20	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
194	20	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
194	20	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
194	20	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
194	20	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
194	20	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
194	20	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
194	20	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	20	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
194	20	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
194	20	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
194	20	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
194	20	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	20	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
194	20	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
194	20	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	20	2-Nitrophenol	4.20E-01	mg/kg			NoC
194	20	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	20	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	20	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
194	20	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
194	20	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
194	20	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
194	20	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	20	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
194	20	Acenaphthylene	4.20E-01	mg/kg			NoC
194	20	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
194	20	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
194	20	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
194	20	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	20	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
194	20	Bis(2-chloroethyl) ether	8.30E-03	mg/kg		2.14E-01	NoA
194	20	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
194	20	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	20	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	20	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
194	20	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
194	20	Dimethyl phthalate	4.20E-01	mg/kg			NoC
194	20	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
194	20	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
194	20	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
194	20	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
194	20	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
194	20	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
194	20	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	20	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
194	20	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
194	20	m,p-Cresol	8.30E-01	mg/kg		3.91E+01	NoA
194	20	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	20	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
194	20	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	20	N-Nitroso-di-n-propylamine	8.30E-03	mg/kg		1.89E-02	NoA
194	20	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
194	20	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	20	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	20	Phenanthrene	4.20E-01	mg/kg			NoC
194	20	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
194	20	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	20	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
194	20	Pyridine	8.30E-01	mg/kg		7.82E+00	NoA
194	20	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	20	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	21	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
194	21	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
194	21	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
194	21	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
194	21	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
194	21	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
194	21	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
194	21	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
194	21	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	21	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
194	21	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
194	21	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
194	21	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
194	21	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	21	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
194	21	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
194	21	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	21	2-Nitrophenol	3.90E-01	mg/kg			NoC
194	21	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	21	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	21	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	21	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
194	21	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
194	21	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	21	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	21	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
194	21	Acenaphthylene	3.90E-01	mg/kg			NoC
194	21	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
194	21	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	21	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
194	21	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC
194	21	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	21	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
194	21	Bis(2-chloroethyl) ether	7.90E-03	mg/kg		2.14E-01	NoA
194	21	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
194	21	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
194	21	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
194	21	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	21	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
194	21	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
194	21	Dimethyl phthalate	3.90E-01	mg/kg			NoC
194	21	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
194	21	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
194	21	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
194	21	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
194	21	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
194	21	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
194	21	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	21	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
194	21	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
194	21	m,p-Cresol	7.90E-01	mg/kg		3.91E+01	NoA
194	21	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	21	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
194	21	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	21	N-Nitroso-di-n-propylamine	7.90E-03	mg/kg		1.89E-02	NoA
194	21	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
194	21	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	21	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	21	Phenanthrene	3.90E-01	mg/kg			NoC
194	21	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
194	21	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	21	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
194	21	Pyridine	7.90E-01	mg/kg		7.82E+00	NoA
194	21	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	21	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	21	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	22	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
194	22	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
194	22	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
194	22	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	22	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
194	22	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
194	22	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
194	22	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
194	22	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	22	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
194	22	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
194	22	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
194	22	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
194	22	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	22	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
194	22	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
194	22	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	22	2-Nitrophenol	3.80E-01	mg/kg			NoC
194	22	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	22	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	22	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
194	22	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
194	22	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
194	22	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
194	22	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	22	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
194	22	Acenaphthylene	3.80E-01	mg/kg			NoC
194	22	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
194	22	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	22	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
194	22	Benzo(ghi)perylene	3.80E-01	mg/kg			NoC
194	22	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
194	22	Bis(2-chloroethyl) ether	7.70E-03	mg/kg		2.14E-01	NoA
194	22	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
194	22	Bis(2-ethylhexyl)phthalate	3.80E-01	mg/kg		1.25E+01	NoA
194	22	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
194	22	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	22	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
194	22	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
194	22	Dimethyl phthalate	3.80E-01	mg/kg			NoC
194	22	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
194	22	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
194	22	Fluoranthene	3.80E-01	mg/kg		1.09E+02	NoA
194	22	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
194	22	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
194	22	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
194	22	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	22	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
194	22	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
194	22	m,p-Cresol	7.70E-01	mg/kg		3.91E+01	NoA
194	22	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	22	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	22	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	22	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	22	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	22	N-Nitroso-di-n-propylamine	7.70E-03	mg/kg		1.89E-02	NoA
194	22	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
194	22	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	22	Phenanthrene	3.80E-01	mg/kg			NoC
194	22	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
194	22	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	22	Pyrene	3.80E-01	mg/kg		8.12E+01	NoA
194	22	Pyridine	7.70E-01	mg/kg		7.82E+00	NoA
194	22	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	22	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	22	Total PAH	7.70E-03	mg/kg		1.97E-02	NoA
194	22	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	23	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
194	23	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
194	23	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
194	23	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
194	23	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
194	23	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
194	23	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
194	23	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
194	23	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	23	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
194	23	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
194	23	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
194	23	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
194	23	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	23	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
194	23	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
194	23	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	23	2-Nitrophenol	4.10E-01	mg/kg			NoC
194	23	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	23	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	23	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	23	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
194	23	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
194	23	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	23	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	23	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
194	23	Acenaphthylene	4.10E-01	mg/kg			NoC
194	23	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
194	23	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
194	23	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
194	23	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	23	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
194	23	Bis(2-chloroethyl) ether	8.10E-03	mg/kg		2.14E-01	NoA
194	23	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
194	23	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	23	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
194	23	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	23	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
194	23	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
194	23	Dimethyl phthalate	4.10E-01	mg/kg			NoC
194	23	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
194	23	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
194	23	Fluoranthene	4.10E-01	mg/kg		1.09E+02	NoA
194	23	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
194	23	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
194	23	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
194	23	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	23	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
194	23	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
194	23	m,p-Cresol	8.10E-01	mg/kg		3.91E+01	NoA
194	23	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	23	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	23	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
194	23	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	23	N-Nitroso-di-n-propylamine	8.10E-03	mg/kg		1.89E-02	NoA
194	23	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
194	23	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	23	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	23	Phenanthrene	4.10E-01	mg/kg			NoC
194	23	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
194	23	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	23	Pyrene	4.10E-01	mg/kg		8.12E+01	NoA
194	23	Pyridine	8.10E-01	mg/kg		7.82E+00	NoA
194	23	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	23	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	24	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
194	24	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
194	24	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
194	24	1,4-Dichlorobenzene	4.40E-01	mg/kg		8.13E-01	NoA
194	24	2,4,5-Trichlorophenol	4.40E-01	mg/kg		3.26E+02	NoA
194	24	2,4,6-Trichlorophenol	4.40E-01	mg/kg		3.26E+00	NoA
194	24	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
194	24	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
194	24	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
194	24	2,4-Dinitrotoluene	4.40E-01	mg/kg		5.63E-01	NoA
194	24	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
194	24	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA
194	24	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
194	24	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
194	24	2-Methylnaphthalene	4.40E-01	mg/kg		1.30E+01	NoA
194	24	2-Methylphenol	4.40E-01	mg/kg		1.54E+02	NoA
194	24	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
194	24	2-Nitrophenol	4.40E-01	mg/kg			NoC
194	24	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	24	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
194	24	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
194	24	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
194	24	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
194	24	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
194	24	4-Nitrophenol	2.10E+00	mg/kg			NoC
194	24	Acenaphthene	4.40E-01	mg/kg		1.17E+02	NoA
194	24	Acenaphthylene	4.40E-01	mg/kg			NoC
194	24	Anthracene	4.40E-01	mg/kg		7.47E+02	NoA
194	24	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	24	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
194	24	Benzo(ghi)perylene	4.40E-01	mg/kg			NoC
194	24	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
194	24	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
194	24	Bis(2-chloroethyl) ether	8.70E-03	mg/kg		2.14E-01	NoA
194	24	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA
194	24	Bis(2-ethylhexyl)phthalate	4.40E-01	mg/kg		1.25E+01	NoA
194	24	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
194	24	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	24	Dibenzofuran	4.40E-01	mg/kg		3.26E+00	NoA
194	24	Diethyl phthalate	4.40E-01	mg/kg		2.61E+03	NoA
194	24	Dimethyl phthalate	4.40E-01	mg/kg			NoC
194	24	Di-n-butyl phthalate	4.40E-01	mg/kg		3.26E+02	NoA
194	24	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA
194	24	Fluoranthene	4.40E-01	mg/kg		1.09E+02	NoA
194	24	Fluorene	4.40E-01	mg/kg		9.15E+01	NoA
194	24	Hexachlorobenzene	4.40E-01	mg/kg		4.92E-02	Yes
194	24	Hexachlorobutadiene	4.40E-01	mg/kg		2.22E+00	NoA
194	24	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
194	24	Hexachloroethane	4.40E-01	mg/kg		2.28E+00	NoA
194	24	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
194	24	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	24	m,p-Cresol	8.70E-01	mg/kg		3.91E+01	NoA
194	24	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	24	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	24	Naphthalene	4.40E-01	mg/kg		1.15E+00	NoA
194	24	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
194	24	N-Nitroso-di-n-propylamine	8.70E-03	mg/kg		1.89E-02	NoA
194	24	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
194	24	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	24	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
194	24	Phenanthrene	4.40E-01	mg/kg			NoC
194	24	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
194	24	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
194	24	Pyrene	4.40E-01	mg/kg		8.12E+01	NoA
194	24	Pyridine	8.70E-01	mg/kg		7.82E+00	NoA
194	24	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	24	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	24	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	25	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
194	25	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
194	25	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
194	25	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
194	25	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
194	25	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
194	25	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
194	25	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
194	25	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	25	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
194	25	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
194	25	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
194	25	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
194	25	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	25	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
194	25	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
194	25	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	25	2-Nitrophenol	4.10E-01	mg/kg			NoC
194	25	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	25	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	25	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	25	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
194	25	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
194	25	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
194	25	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	25	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
194	25	Acenaphthylene	4.10E-01	mg/kg			NoC
194	25	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
194	25	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	25	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
194	25	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
194	25	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	25	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
194	25	Bis(2-chloroethyl) ether	8.10E-03	mg/kg		2.14E-01	NoA
194	25	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
194	25	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
194	25	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
194	25	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	25	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
194	25	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
194	25	Dimethyl phthalate	4.10E-01	mg/kg			NoC
194	25	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
194	25	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
194	25	Fluoranthene	4.10E-01	mg/kg		1.09E+02	NoA
194	25	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
194	25	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
194	25	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
194	25	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	25	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	25	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
194	25	m,p-Cresol	8.10E-01	mg/kg		3.91E+01	NoA
194	25	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	25	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	25	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
194	25	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	25	N-Nitroso-di-n-propylamine	8.10E-03	mg/kg		1.89E-02	NoA
194	25	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
194	25	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	25	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	25	Phenanthrene	4.10E-01	mg/kg			NoC
194	25	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
194	25	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	25	Pyrene	4.10E-01	mg/kg		8.12E+01	NoA
194	25	Pyridine	8.10E-01	mg/kg		7.82E+00	NoA
194	25	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	25	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
194	25	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	26	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
194	26	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
194	26	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
194	26	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
194	26	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
194	26	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
194	26	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
194	26	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
194	26	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	26	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
194	26	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
194	26	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
194	26	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
194	26	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	26	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
194	26	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
194	26	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	26	2-Nitrophenol	3.90E-01	mg/kg			NoC
194	26	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	26	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	26	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	26	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
194	26	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
194	26	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	26	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	26	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
194	26	Acenaphthylene	3.90E-01	mg/kg			NoC
194	26	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
194	26	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	26	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
194	26	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	26	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	26	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
194	26	Bis(2-chloroethyl) ether	7.80E-03	mg/kg		2.14E-01	NoA
194	26	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
194	26	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
194	26	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
194	26	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	26	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
194	26	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
194	26	Dimethyl phthalate	3.90E-01	mg/kg			NoC
194	26	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
194	26	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
194	26	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
194	26	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
194	26	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
194	26	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
194	26	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	26	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
194	26	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
194	26	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	26	m,p-Cresol	7.80E-01	mg/kg		3.91E+01	NoA
194	26	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	26	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	26	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
194	26	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
194	26	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	26	N-Nitroso-di-n-propylamine	7.80E-03	mg/kg		1.89E-02	NoA
194	26	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
194	26	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	26	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	26	Phenanthrene	3.90E-01	mg/kg			NoC
194	26	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
194	26	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	26	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
194	26	Pyridine	7.80E-01	mg/kg		7.82E+00	NoA
194	26	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	26	Total PAH	7.80E-03	mg/kg		1.97E-02	NoA
194	26	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	27	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
194	27	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA
194	27	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
194	27	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
194	27	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
194	27	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
194	27	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
194	27	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
194	27	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
194	27	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
194	27	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	27	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
194	27	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
194	27	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	27	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
194	27	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
194	27	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	27	2-Nitrophenol	4.00E-01	mg/kg			NoC
194	27	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	27	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	27	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	27	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
194	27	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
194	27	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	27	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	27	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
194	27	Acenaphthylene	4.00E-01	mg/kg			NoC
194	27	Anthracene	4.00E-01	mg/kg		7.47E+02	NoA
194	27	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	27	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
194	27	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
194	27	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	27	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA
194	27	Bis(2-chloroethyl) ether	8.10E-03	mg/kg		2.14E-01	NoA
194	27	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
194	27	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
194	27	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
194	27	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	27	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
194	27	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
194	27	Dimethyl phthalate	4.00E-01	mg/kg			NoC
194	27	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
194	27	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
194	27	Fluoranthene	4.00E-01	mg/kg		1.09E+02	NoA
194	27	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
194	27	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
194	27	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
194	27	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	27	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
194	27	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA
194	27	m,p-Cresol	8.10E-01	mg/kg		3.91E+01	NoA
194	27	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	27	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	27	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
194	27	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	27	N-Nitroso-di-n-propylamine	8.10E-03	mg/kg		1.89E-02	NoA
194	27	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
194	27	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	27	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
194	27	Phenanthrene	4.00E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	27	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
194	27	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	27	Pyrene	4.00E-01	mg/kg		8.12E+01	NoA
194	27	Pyridine	8.10E-01	mg/kg		7.82E+00	NoA
194	27	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	27	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	28	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
194	28	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
194	28	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
194	28	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
194	28	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
194	28	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
194	28	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
194	28	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
194	28	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
194	28	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
194	28	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
194	28	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
194	28	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
194	28	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
194	28	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
194	28	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
194	28	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
194	28	2-Nitrophenol	3.90E-01	mg/kg			NoC
194	28	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
194	28	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
194	28	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	28	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
194	28	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
194	28	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
194	28	4-Nitrophenol	1.90E+00	mg/kg			NoC
194	28	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
194	28	Acenaphthylene	3.90E-01	mg/kg			NoC
194	28	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
194	28	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
194	28	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC
194	28	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
194	28	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
194	28	Bis(2-chloroethyl) ether	7.70E-03	mg/kg		2.14E-01	NoA
194	28	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
194	28	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
194	28	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
194	28	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	28	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
194	28	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
194	28	Dimethyl phthalate	3.90E-01	mg/kg			NoC
194	28	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
194	28	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
194	28	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	28	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
194	28	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
194	28	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
194	28	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
194	28	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
194	28	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
194	28	m,p-Cresol	7.70E-01	mg/kg		3.91E+01	NoA
194	28	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	28	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	28	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
194	28	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
194	28	N-Nitroso-di-n-propylamine	7.70E-03	mg/kg		1.89E-02	NoA
194	28	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
194	28	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	28	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
194	28	Phenanthrene	3.90E-01	mg/kg			NoC
194	28	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
194	28	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
194	28	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
194	28	Pyridine	7.70E-01	mg/kg		7.82E+00	NoA
194	28	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	28	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	29	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
194	29	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
194	29	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
194	29	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
194	29	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
194	29	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
194	29	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
194	29	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
194	29	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
194	29	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
194	29	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
194	29	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
194	29	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
194	29	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
194	29	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
194	29	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
194	29	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
194	29	2-Nitrophenol	3.70E-01	mg/kg			NoC
194	29	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
194	29	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
194	29	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
194	29	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
194	29	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
194	29	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
194	29	4-Nitrophenol	1.80E+00	mg/kg			NoC
194	29	Acenaphthene	3.70E-01	mg/kg		1.17E+02	NoA
194	29	Acenaphthylene	3.70E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	29	Anthracene	3.70E-01	mg/kg		7.47E+02	NoA
194	29	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	29	Benzenemethanol	3.70E-01	mg/kg		3.26E+02	NoA
194	29	Benzo(ghi)perylene	3.70E-01	mg/kg			NoC
194	29	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
194	29	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
194	29	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
194	29	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
194	29	Bis(2-ethylhexyl)phthalate	3.70E-01	mg/kg		1.25E+01	NoA
194	29	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
194	29	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	29	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
194	29	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
194	29	Dimethyl phthalate	3.70E-01	mg/kg			NoC
194	29	Di-n-butyl phthalate	3.70E-01	mg/kg		3.26E+02	NoA
194	29	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
194	29	Fluoranthene	3.70E-01	mg/kg		1.09E+02	NoA
194	29	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
194	29	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
194	29	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
194	29	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
194	29	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
194	29	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
194	29	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA
194	29	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
194	29	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	29	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
194	29	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
194	29	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
194	29	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
194	29	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	29	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
194	29	Phenanthrene	3.70E-01	mg/kg			NoC
194	29	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
194	29	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
194	29	Pyrene	3.70E-01	mg/kg		8.12E+01	NoA
194	29	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
194	29	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	29	Total PAH	7.30E-03	mg/kg		1.97E-02	NoA
194	29	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	30	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
194	30	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA
194	30	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
194	30	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
194	30	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
194	30	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
194	30	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
194	30	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
194	30	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	30	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
194	30	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA
194	30	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
194	30	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
194	30	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
194	30	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
194	30	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
194	30	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
194	30	2-Nitrophenol	4.00E-01	mg/kg			NoC
194	30	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
194	30	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
194	30	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	30	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
194	30	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
194	30	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC
194	30	4-Nitrophenol	2.00E+00	mg/kg			NoC
194	30	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
194	30	Acenaphthylene	4.00E-01	mg/kg			NoC
194	30	Anthracene	4.00E-01	mg/kg		7.47E+02	NoA
194	30	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
194	30	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
194	30	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
194	30	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
194	30	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA
194	30	Bis(2-chloroethyl) ether	8.10E-03	mg/kg		2.14E-01	NoA
194	30	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
194	30	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
194	30	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
194	30	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
194	30	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
194	30	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
194	30	Dimethyl phthalate	4.00E-01	mg/kg			NoC
194	30	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
194	30	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
194	30	Fluoranthene	4.00E-01	mg/kg		1.09E+02	NoA
194	30	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
194	30	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
194	30	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
194	30	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
194	30	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
194	30	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA
194	30	m,p-Cresol	8.10E-01	mg/kg		3.91E+01	NoA
194	30	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
194	30	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
194	30	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
194	30	N-Nitroso-di-n-propylamine	8.10E-03	mg/kg		1.89E-02	NoA
194	30	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
194	30	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
194	30	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	30	Phenanthrene	4.00E-01	mg/kg			NoC
194	30	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
194	30	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
194	30	Pyrene	4.00E-01	mg/kg		8.12E+01	NoA
194	30	Pyridine	8.10E-01	mg/kg		7.82E+00	NoA
194	30	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
194	30	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
194	31	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
194	31	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
194	31	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
194	31	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
194	31	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
194	31	1,2,4-Trichlorobenzene	4.70E-01	mg/kg		7.86E-01	NoA
194	31	1,2-Dichlorobenzene	4.70E-01	mg/kg		2.92E+01	NoA
194	31	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
194	31	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
194	31	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
194	31	1,3-Dichlorobenzene	4.70E-01	mg/kg			NoC
194	31	1,4-Dichlorobenzene	4.70E-01	mg/kg		8.13E-01	NoA
194	31	2,4,5-Trichlorophenol	4.70E-01	mg/kg		3.26E+02	NoA
194	31	2,4,6-Trichlorophenol	4.70E-01	mg/kg		3.26E+00	NoA
194	31	2,4-Dichlorophenol	4.70E-01	mg/kg		9.78E+00	NoA
194	31	2,4-Dimethylphenol	4.70E-01	mg/kg		6.52E+01	NoA
194	31	2,4-Dinitrophenol	4.70E-01	mg/kg		6.52E+00	NoA
194	31	2,4-Dinitrotoluene	4.70E-01	mg/kg		5.63E-01	NoA
194	31	2,6-Dinitrotoluene	4.70E-01	mg/kg		3.26E+00	NoA
194	31	2-Chloronaphthalene	4.70E-01	mg/kg		6.26E+02	NoA
194	31	2-Chlorophenol	4.70E-01	mg/kg		3.91E+01	NoA
194	31	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
194	31	2-Methyl-4,6-dinitrophenol	4.70E-01	mg/kg		2.61E-01	Yes
194	31	2-Methylnaphthalene	4.70E-01	mg/kg		1.30E+01	NoA
194	31	2-Methylphenol	4.70E-01	mg/kg		1.54E+02	NoA
194	31	2-Nitrobenzenamine	4.70E-01	mg/kg		2.96E-01	Yes
194	31	2-Nitrophenol	4.70E-01	mg/kg			NoC
194	31	3,3'-Dichlorobenzidine	4.70E-01	mg/kg		3.85E-01	Yes
194	31	3-Nitrobenzenamine	4.70E-01	mg/kg		9.78E-01	Yes
194	31	4-Bromophenyl phenyl ether	4.70E-01	mg/kg			NoC
194	31	4-Chloro-3-methylphenol	4.70E-01	mg/kg			NoC
194	31	4-Chlorobenzenamine	4.70E-01	mg/kg		8.66E-01	NoA
194	31	4-Chlorophenyl phenyl ether	4.70E-01	mg/kg			NoC
194	31	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
194	31	4-Nitrophenol	4.70E-01	mg/kg			NoC
194	31	Acenaphthene	4.70E-01	mg/kg		1.17E+02	NoA
194	31	Acenaphthylene	4.70E-01	mg/kg			NoC
194	31	Anthracene	4.70E-01	mg/kg		7.47E+02	NoA
194	31	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
194	31	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
194	31	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
194	31	Benzenemethanol	4.70E-01	mg/kg		3.26E+02	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	31	Benzo(ghi)perylene	4.70E-01	mg/kg			NoC
194	31	Benzoic acid	4.70E-01	mg/kg		1.30E+04	NoA
194	31	Beryllium	5.00E-01	mg/kg	6.70E-01	5.67E-03	NoB
194	31	Bis(2-chloroethoxy)methane	4.70E-01	mg/kg		9.78E+00	NoA
194	31	Bis(2-chloroethyl) ether	4.70E-01	mg/kg		2.14E-01	Yes
194	31	Bis(2-chloroisopropyl) ether	4.70E-01	mg/kg		4.57E+00	NoA
194	31	Bis(2-ethylhexyl)phthalate	4.70E-01	mg/kg		1.25E+01	NoA
194	31	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
194	31	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
194	31	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
194	31	Butyl benzyl phthalate	4.70E-01	mg/kg		9.18E+01	NoA
194	31	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
194	31	Carbazole	4.70E-01	mg/kg		8.72E+00	NoA
194	31	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
194	31	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
194	31	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
194	31	Chloroethane	1.00E-02	mg/kg		1.45E+03	NoA
194	31	Chloroform	1.00E-02	mg/kg		1.22E-01	NoA
194	31	Chloromethane	1.00E-02	mg/kg		1.65E+00	NoA
194	31	cis-1,2-Dichloroethene	1.00E-02	mg/kg		1.05E+00	NoA
194	31	cis-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
194	31	Dibenzofuran	4.70E-01	mg/kg		3.26E+00	NoA
194	31	Dibromochloromethane	1.00E-02	mg/kg		2.42E-01	NoA
194	31	Diethyl phthalate	4.70E-01	mg/kg		2.61E+03	NoA
194	31	Dimethyl phthalate	4.70E-01	mg/kg			NoC
194	31	Di-n-octylphthalate	4.70E-01	mg/kg		1.30E+02	NoA
194	31	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
194	31	Fluoranthene	4.70E-01	mg/kg		1.09E+02	NoA
194	31	Fluorene	4.70E-01	mg/kg		9.15E+01	NoA
194	31	Hexachlorobenzene	4.70E-01	mg/kg		4.92E-02	Yes
194	31	Hexachlorobutadiene	4.70E-01	mg/kg		2.22E+00	NoA
194	31	Hexachlorocyclopentadiene	4.70E-01	mg/kg		1.95E+01	NoA
194	31	Hexachloroethane	4.70E-01	mg/kg		2.28E+00	NoA
194	31	Isophorone	4.70E-01	mg/kg		1.82E+02	NoA
194	31	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
194	31	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
194	31	Mercury	2.00E-01	mg/kg	2.00E-01	2.13E-01	NoA
194	31	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
194	31	Naphthalene	4.70E-01	mg/kg		1.15E+00	NoA
194	31	Nitrobenzene	4.70E-01	mg/kg		4.79E+00	NoA
194	31	N-Nitroso-di-n-propylamine	4.70E-01	mg/kg		1.89E-02	Yes
194	31	N-Nitrosodiphenylamine	4.70E-01	mg/kg		3.22E+01	NoA
194	31	PCB, Total	1.00E-01	mg/kg		6.48E-02	Yes
194	31	Pentachlorophenol	4.70E-01	mg/kg		4.36E-01	Yes
194	31	Phenanthrene	4.70E-01	mg/kg			NoC
194	31	Phenol	4.70E-01	mg/kg		4.98E+02	NoA
194	31	p-Nitroaniline	4.70E-01	mg/kg		8.66E+00	NoA
194	31	Pyrene	4.70E-01	mg/kg		8.12E+01	NoA
194	31	Pyridine	4.70E-01	mg/kg		7.82E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
194	31	Selenium	1.00E+00	mg/kg	8.00E-01	2.30E+01	NoA
194	31	Silver	4.00E+00	mg/kg	2.30E+00	2.61E+00	Yes
194	31	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
194	31	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
194	31	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
194	31	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
194	31	Total PAH	4.70E-01	mg/kg		1.97E-02	Yes
194	31	Total Xylene	3.00E-02	mg/kg		7.96E+00	NoA
194	31	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
194	31	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
194	31	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
194	31	Vinyl acetate	1.00E-02	mg/kg		1.83E+01	NoA
194	31	Vinyl chloride	1.00E-02	mg/kg		8.24E-02	NoA
196	1	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
196	1	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
196	1	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
196	1	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
196	1	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
196	1	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
196	1	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
196	1	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
196	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
196	1	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
196	1	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
196	1	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
196	1	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
196	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
196	1	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
196	1	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
196	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
196	1	2-Nitrophenol	3.80E-01	mg/kg			NoC
196	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
196	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
196	1	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
196	1	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
196	1	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
196	1	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
196	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
196	1	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
196	1	Acenaphthylene	3.80E-01	mg/kg			NoC
196	1	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
196	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
196	1	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
196	1	Benzo(ghi)perylene	3.80E-01	mg/kg			NoC
196	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
196	1	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
196	1	Bis(2-chloroethyl) ether	7.60E-03	mg/kg		2.14E-01	NoA
196	1	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
196	1	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
196	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
196	1	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
196	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
196	1	Dimethyl phthalate	3.80E-01	mg/kg			NoC
196	1	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
196	1	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
196	1	Fluoranthene	3.80E-01	mg/kg		1.09E+02	NoA
196	1	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
196	1	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
196	1	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
196	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
196	1	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
196	1	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
196	1	m,p-Cresol	7.60E-01	mg/kg		3.91E+01	NoA
196	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
196	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
196	1	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
196	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
196	1	N-Nitroso-di-n-propylamine	7.60E-03	mg/kg		1.89E-02	NoA
196	1	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
196	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
196	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
196	1	Phenanthrene	3.80E-01	mg/kg			NoC
196	1	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
196	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
196	1	Pyrene	3.80E-01	mg/kg		8.12E+01	NoA
196	1	Pyridine	7.60E-01	mg/kg		7.82E+00	NoA
196	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
196	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
196	1	Total PAH	7.60E-03	mg/kg		1.97E-02	NoA
196	2	Acenaphthene	4.98E-01	mg/kg		1.17E+02	NoA
196	2	Acenaphthylene	4.98E-01	mg/kg			NoC
196	2	Anthracene	4.98E-01	mg/kg		7.47E+02	NoA
196	2	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
196	2	Benzene	1.00E+00	mg/kg		3.33E-01	Yes
196	2	Benzo(ghi)perylene	4.98E-01	mg/kg			NoC
196	2	Beryllium	1.81E-01	mg/kg	6.70E-01	5.67E-03	NoB
196	2	Ethylbenzene	1.00E+00	mg/kg		1.58E+00	NoA
196	2	Fluoranthene	4.98E-01	mg/kg		1.09E+02	NoA
196	2	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
196	2	Lead	2.50E+01	mg/kg	3.60E+01	4.00E+02	NoAB
196	2	Mercury	2.00E-01	mg/kg	2.00E-01	2.13E-01	NoA
196	2	Naphthalene	4.98E-01	mg/kg		1.15E+00	NoA
196	2	Phenanthrene	4.98E-01	mg/kg			NoC
196	2	Pyrene	4.98E-01	mg/kg		8.12E+01	NoA
196	2	Selenium	1.00E+00	mg/kg	8.00E-01	2.30E+01	NoA
196	2	Silver	3.00E+00	mg/kg	2.30E+00	2.61E+00	Yes
196	2	Toluene	1.00E+00	mg/kg		9.61E+01	NoA
196	2	Total Xylene	1.00E+00	mg/kg		7.96E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
196	2	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
489	1	1,1,1,2-Tetrachloroethane	5.70E-03	mg/kg		1.86E+00	NoA
489	1	1,1,1-Trichloroethane	5.70E-03	mg/kg		1.46E+02	NoA
489	1	1,1,2,2-Tetrachloroethane	5.70E-03	mg/kg		5.62E-01	NoA
489	1	1,1,2-Trichloroethane	5.70E-03	mg/kg		2.30E-02	NoA
489	1	1,1-Dichloroethane	5.70E-03	mg/kg		1.34E+00	NoA
489	1	1,1-Dichloroethene	5.70E-03	mg/kg		2.37E-02	NoA
489	1	1,2,3-Trichloropropane	5.70E-03	mg/kg		4.97E-03	Yes
489	1	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
489	1	1,2-Dibromoethane	5.70E-03	mg/kg		3.37E-02	NoA
489	1	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
489	1	1,2-Dichloroethane	5.70E-03	mg/kg		1.55E-01	NoA
489	1	1,2-Dichloropropane	5.70E-03	mg/kg		9.40E-01	NoA
489	1	1,2-Dimethylbenzene	5.70E-03	mg/kg		5.35E+01	NoA
489	1	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
489	1	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
489	1	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
489	1	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
489	1	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
489	1	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
489	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
489	1	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
489	1	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
489	1	2-Butanone	2.30E-02	mg/kg		5.78E+02	NoA
489	1	2-Chloroethyl vinyl ether	2.30E-02	mg/kg			NoC
489	1	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
489	1	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
489	1	2-Hexanone	2.30E-02	mg/kg		4.05E+00	NoA
489	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
489	1	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
489	1	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
489	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
489	1	2-Nitrophenol	3.80E-01	mg/kg			NoC
489	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
489	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
489	1	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
489	1	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
489	1	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
489	1	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
489	1	4-Methyl-2-pentanone	2.30E-02	mg/kg		1.13E+02	NoA
489	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
489	1	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
489	1	Acenaphthylene	3.80E-01	mg/kg			NoC
489	1	Acetone	2.30E-02	mg/kg		1.34E+03	NoA
489	1	Acrolein	5.70E-02	mg/kg			NoC
489	1	Acrylonitrile	5.70E-02	mg/kg		7.43E-02	NoA
489	1	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
489	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
489	1	Benzene	5.70E-03	mg/kg		3.33E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
489	1	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
489	1	Benzo(ghi)perylene	3.80E-01	mg/kg			NoC
489	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
489	1	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
489	1	Bis(2-chloroethyl) ether	7.60E-03	mg/kg		2.14E-01	NoA
489	1	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
489	1	Bis(2-ethylhexyl)phthalate	3.80E-01	mg/kg		1.25E+01	NoA
489	1	Bromodichloromethane	5.70E-03	mg/kg		2.73E-01	NoA
489	1	Bromoform	5.70E-03	mg/kg		2.19E+01	NoA
489	1	Bromomethane	1.10E-02	mg/kg		1.34E-01	NoA
489	1	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
489	1	Carbon disulfide	5.70E-03	mg/kg		1.48E+01	NoA
489	1	Carbon tetrachloride	5.70E-03	mg/kg		2.39E-01	NoA
489	1	Chlorobenzene	5.70E-03	mg/kg		4.07E+00	NoA
489	1	Chloroethane	1.10E-02	mg/kg		1.45E+03	NoA
489	1	Chloroform	5.70E-03	mg/kg		1.22E-01	NoA
489	1	Chloromethane	1.10E-02	mg/kg		1.65E+00	NoA
489	1	cis-1,2-Dichloroethene	5.70E-03	mg/kg		1.05E+00	NoA
489	1	cis-1,3-Dichloropropene	5.70E-03	mg/kg			NoC
489	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
489	1	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
489	1	Dibromochloromethane	5.70E-03	mg/kg		2.42E-01	NoA
489	1	Dibromomethane	5.70E-03	mg/kg		2.46E+00	NoA
489	1	Dichlorodifluoromethane	1.10E-02	mg/kg		9.38E+00	NoA
489	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
489	1	Dimethyl phthalate	3.80E-01	mg/kg			NoC
489	1	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
489	1	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
489	1	Ethyl methacrylate	5.70E-03	mg/kg		1.52E+02	NoA
489	1	Ethylbenzene	5.70E-03	mg/kg		1.58E+00	NoA
489	1	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
489	1	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
489	1	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
489	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
489	1	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
489	1	Iodomethane	5.70E-03	mg/kg			NoC
489	1	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
489	1	m,p-Cresol	7.60E-01	mg/kg		3.91E+01	NoA
489	1	m,p-Xylene	5.70E-03	mg/kg		7.96E+00	NoA
489	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
489	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
489	1	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
489	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
489	1	N-Nitroso-di-n-propylamine	7.60E-03	mg/kg		1.89E-02	NoA
489	1	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
489	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
489	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
489	1	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
489	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
489	1	Pyridine	7.60E-01	mg/kg		7.82E+00	NoA
489	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
489	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
489	1	Styrene	5.70E-03	mg/kg		9.43E+01	NoA
489	1	Tetrachloroethene	5.70E-03	mg/kg		1.13E-01	NoA
489	1	Toluene	5.70E-03	mg/kg		9.61E+01	NoA
489	1	trans-1,2-Dichloroethene	5.70E-03	mg/kg		2.43E+00	NoA
489	1	trans-1,3-Dichloropropene	5.70E-03	mg/kg			NoC
489	1	Trans-1,4-Dichloro-2-butene	1.10E-02	mg/kg		6.94E-03	Yes
489	1	Trichloroethene	5.70E-03	mg/kg		2.34E-02	NoA
489	1	Trichlorofluoromethane	5.70E-03	mg/kg		7.87E+01	NoA
489	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
489	1	Vinyl acetate	5.70E-03	mg/kg		1.83E+01	NoA
489	1	Vinyl chloride	5.70E-03	mg/kg		8.24E-02	NoA
531	1	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
531	1	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
531	1	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
531	1	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
531	1	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
531	1	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
531	1	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
531	1	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
531	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
531	1	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
531	1	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
531	1	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
531	1	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
531	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
531	1	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
531	1	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
531	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
531	1	2-Nitrophenol	3.50E-01	mg/kg			NoC
531	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
531	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
531	1	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
531	1	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
531	1	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
531	1	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
531	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
531	1	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
531	1	Acenaphthylene	3.50E-01	mg/kg			NoC
531	1	Anthracene	3.50E-01	mg/kg		7.47E+02	NoA
531	1	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
531	1	Benzo(ghi)perylene	3.50E-01	mg/kg			NoC
531	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
531	1	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
531	1	Bis(2-chloroethyl) ether	6.90E-03	mg/kg		2.14E-01	NoA
531	1	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
531	1	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
531	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
531	1	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
531	1	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
531	1	Dimethyl phthalate	3.50E-01	mg/kg			NoC
531	1	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
531	1	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
531	1	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
531	1	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
531	1	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
531	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
531	1	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
531	1	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
531	1	m,p-Cresol	6.90E-01	mg/kg		3.91E+01	NoA
531	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
531	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
531	1	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
531	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
531	1	N-Nitroso-di-n-propylamine	6.90E-03	mg/kg		1.89E-02	NoA
531	1	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
531	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
531	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
531	1	Phenanthrene	3.50E-01	mg/kg			NoC
531	1	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
531	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
531	1	Pyridine	6.90E-01	mg/kg		7.82E+00	NoA
531	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
531	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
531	1	Thallium	2.10E-01	mg/kg	2.10E-01	3.68E-01	NoA
200	1	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
200	1	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
200	1	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
200	1	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
200	1	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
200	1	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
200	1	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
200	1	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
200	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
200	1	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
200	1	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
200	1	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
200	1	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
200	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
200	1	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
200	1	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
200	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
200	1	2-Nitrophenol	3.70E-01	mg/kg			NoC
200	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
200	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
200	1	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
200	1	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
200	1	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
200	1	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
200	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
200	1	Acenaphthene	3.70E-01	mg/kg		1.17E+02	NoA
200	1	Acenaphthylene	3.70E-01	mg/kg			NoC
200	1	Anthracene	3.70E-01	mg/kg		7.47E+02	NoA
200	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
200	1	Benzenemethanol	3.70E-01	mg/kg		3.26E+02	NoA
200	1	Benzo(ghi)perylene	3.70E-01	mg/kg			NoC
200	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
200	1	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
200	1	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
200	1	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
200	1	Bis(2-ethylhexyl)phthalate	3.70E-01	mg/kg		1.25E+01	NoA
200	1	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
200	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
200	1	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
200	1	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
200	1	Dimethyl phthalate	3.70E-01	mg/kg			NoC
200	1	Di-n-butyl phthalate	3.70E-01	mg/kg		3.26E+02	NoA
200	1	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
200	1	Fluoranthene	3.70E-01	mg/kg		1.09E+02	NoA
200	1	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
200	1	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
200	1	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
200	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
200	1	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
200	1	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
200	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
200	1	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA
200	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
200	1	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
200	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
200	1	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
200	1	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
200	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
200	1	Phenanthrene	3.70E-01	mg/kg			NoC
200	1	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
200	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
200	1	Pyrene	3.70E-01	mg/kg		8.12E+01	NoA
200	1	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
200	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
200	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
212	1	1,1,1-Trichloroethane	5.00E-03	mg/kg		1.46E+02	NoA
212	1	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
212	1	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
212	1	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
212	1	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA

A = <Child Resident NAL C = no NAL available
B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
212	1	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
212	1	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
212	1	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
212	1	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
212	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
212	1	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
212	1	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
212	1	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
212	1	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
212	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
212	1	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
212	1	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
212	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
212	1	2-Nitrophenol	3.40E-01	mg/kg			NoC
212	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
212	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
212	1	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
212	1	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
212	1	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
212	1	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
212	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
212	1	Acenaphthene	4.90E-01	mg/kg		1.17E+02	NoA
212	1	Acenaphthylene	4.90E-01	mg/kg			NoC
212	1	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
212	1	Antimony	9.74E+00	mg/kg	2.10E-01	5.52E-01	Yes
212	1	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
212	1	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
212	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
212	1	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
212	1	Bis(2-chloroethyl) ether	3.30E-01	mg/kg		2.14E-01	Yes
212	1	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
212	1	Bis(2-ethylhexyl)phthalate	3.40E-01	mg/kg		1.25E+01	NoA
212	1	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
212	1	Cadmium	1.95E+00	mg/kg	2.10E-01	8.11E-01	Yes
212	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
212	1	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
212	1	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
212	1	Dimethyl phthalate	3.40E-01	mg/kg			NoC
212	1	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
212	1	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
212	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
212	1	Fluorene	4.90E-01	mg/kg		9.15E+01	NoA
212	1	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
212	1	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
212	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
212	1	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
212	1	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
212	1	Lead	1.95E+01	mg/kg	3.60E+01	4.00E+02	NoAB
212	1	m,p-Cresol	6.90E-01	mg/kg		3.91E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
212	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
212	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
212	1	Naphthalene	4.90E-01	mg/kg		1.15E+00	NoA
212	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
212	1	N-Nitroso-di-n-propylamine	3.30E-01	mg/kg		1.89E-02	Yes
212	1	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
212	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
212	1	Phenanthrene	4.90E-01	mg/kg			NoC
212	1	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
212	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
212	1	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
212	1	Pyridine	6.90E-01	mg/kg		7.82E+00	NoA
212	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
212	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
212	1	Sodium	9.74E+01	mg/kg	3.20E+02		NoBE
212	1	Thallium	1.95E+01	mg/kg	2.10E-01	3.68E-01	Yes
212	1	Total PAH	4.90E-01	mg/kg		1.97E-02	Yes
212	1	Trichloroethene	5.00E-03	mg/kg		2.34E-02	NoA
213	1	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
213	1	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
213	1	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
213	1	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
213	1	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
213	1	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
213	1	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
213	1	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
213	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
213	1	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
213	1	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
213	1	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
213	1	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
213	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
213	1	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
213	1	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
213	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
213	1	2-Nitrophenol	3.40E-01	mg/kg			NoC
213	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
213	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
213	1	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
213	1	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
213	1	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
213	1	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
213	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
213	1	Acenaphthene	3.40E-01	mg/kg		1.17E+02	NoA
213	1	Acenaphthylene	3.40E-01	mg/kg			NoC
213	1	Anthracene	3.40E-01	mg/kg		7.47E+02	NoA
213	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
213	1	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
213	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
213	1	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
213	1	Bis(2-chloroethyl) ether	6.90E-03	mg/kg		2.14E-01	NoA
213	1	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
213	1	Bis(2-ethylhexyl)phthalate	3.40E-01	mg/kg		1.25E+01	NoA
213	1	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
213	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
213	1	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
213	1	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
213	1	Dimethyl phthalate	3.40E-01	mg/kg			NoC
213	1	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
213	1	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
213	1	Fluorene	3.40E-01	mg/kg		9.15E+01	NoA
213	1	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
213	1	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
213	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
213	1	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
213	1	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
213	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
213	1	m,p-Cresol	6.90E-01	mg/kg		3.91E+01	NoA
213	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
213	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
213	1	Naphthalene	3.40E-01	mg/kg		1.15E+00	NoA
213	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
213	1	N-Nitroso-di-n-propylamine	6.90E-03	mg/kg		1.89E-02	NoA
213	1	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
213	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
213	1	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
213	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
213	1	Pyridine	6.90E-01	mg/kg		7.82E+00	NoA
213	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
213	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
213	2	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
213	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
213	2	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
213	2	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
213	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
213	2	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
213	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
213	2	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
214	1	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
214	1	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
214	1	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
214	1	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
214	1	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
214	1	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
214	1	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
214	1	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
214	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
214	1	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
214	1	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
214	1	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
214	1	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
214	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
214	1	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
214	1	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
214	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
214	1	2-Nitrophenol	3.70E-01	mg/kg			NoC
214	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
214	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
214	1	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
214	1	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
214	1	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
214	1	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
214	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
214	1	Acenaphthene	3.70E-01	mg/kg		1.17E+02	NoA
214	1	Acenaphthylene	3.70E-01	mg/kg			NoC
214	1	Anthracene	3.70E-01	mg/kg		7.47E+02	NoA
214	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
214	1	Benzenemethanol	3.70E-01	mg/kg		3.26E+02	NoA
214	1	Benzo(ghi)perylene	3.70E-01	mg/kg			NoC
214	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
214	1	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
214	1	Bis(2-chloroethyl) ether	7.50E-03	mg/kg		2.14E-01	NoA
214	1	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
214	1	Bis(2-ethylhexyl)phthalate	3.70E-01	mg/kg		1.25E+01	NoA
214	1	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
214	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
214	1	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
214	1	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
214	1	Dimethyl phthalate	3.70E-01	mg/kg			NoC
214	1	Di-n-butyl phthalate	3.70E-01	mg/kg		3.26E+02	NoA
214	1	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
214	1	Fluoranthene	3.70E-01	mg/kg		1.09E+02	NoA
214	1	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
214	1	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
214	1	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
214	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
214	1	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
214	1	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
214	1	m,p-Cresol	7.50E-01	mg/kg		3.91E+01	NoA
214	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
214	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
214	1	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
214	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
214	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
214	1	N-Nitroso-di-n-propylamine	7.50E-03	mg/kg		1.89E-02	NoA
214	1	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
214	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
214	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
214	1	Phenanthrene	3.70E-01	mg/kg			NoC
214	1	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
214	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
214	1	Pyrene	3.70E-01	mg/kg		8.12E+01	NoA
214	1	Pyridine	7.50E-01	mg/kg		7.82E+00	NoA
214	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
214	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
214	1	Thallium	2.30E-01	mg/kg	2.10E-01	3.68E-01	NoA
214	1	Total PAH	7.50E-03	mg/kg		1.97E-02	NoA
214	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
215	1	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
215	1	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
215	1	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
215	1	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
215	1	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
215	1	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
215	1	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
215	1	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
215	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
215	1	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
215	1	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
215	1	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
215	1	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
215	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
215	1	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
215	1	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
215	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
215	1	2-Nitrophenol	3.50E-01	mg/kg			NoC
215	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
215	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
215	1	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
215	1	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
215	1	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
215	1	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
215	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
215	1	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
215	1	Acenaphthylene	3.50E-01	mg/kg			NoC
215	1	Anthracene	3.50E-01	mg/kg		7.47E+02	NoA
215	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
215	1	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
215	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
215	1	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
215	1	Bis(2-chloroethyl) ether	6.90E-03	mg/kg		2.14E-01	NoA
215	1	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
215	1	Bis(2-ethylhexyl)phthalate	3.50E-01	mg/kg		1.25E+01	NoA
215	1	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
215	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
215	1	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
215	1	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
215	1	Dimethyl phthalate	3.50E-01	mg/kg			NoC
215	1	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
215	1	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
215	1	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
215	1	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
215	1	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
215	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
215	1	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
215	1	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
215	1	m,p-Cresol	6.90E-01	mg/kg		3.91E+01	NoA
215	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
215	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
215	1	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
215	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
215	1	N-Nitroso-di-n-propylamine	6.90E-03	mg/kg		1.89E-02	NoA
215	1	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
215	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
215	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
215	1	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
215	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
215	1	Pyridine	6.90E-01	mg/kg		7.82E+00	NoA
215	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
215	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
215	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
216	1	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
216	1	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
216	1	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
216	1	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
216	1	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
216	1	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
216	1	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
216	1	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
216	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
216	1	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
216	1	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
216	1	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
216	1	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
216	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
216	1	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
216	1	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
216	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
216	1	2-Nitrophenol	3.80E-01	mg/kg			NoC
216	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
216	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
216	1	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
216	1	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
216	1	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
216	1	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
216	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
216	1	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
216	1	Acenaphthylene	3.80E-01	mg/kg			NoC
216	1	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
216	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
216	1	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
216	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
216	1	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
216	1	Bis(2-chloroethyl) ether	7.60E-03	mg/kg		2.14E-01	NoA
216	1	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
216	1	Bis(2-ethylhexyl)phthalate	3.80E-01	mg/kg		1.25E+01	NoA
216	1	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
216	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
216	1	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
216	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
216	1	Dimethyl phthalate	3.80E-01	mg/kg			NoC
216	1	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
216	1	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
216	1	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
216	1	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
216	1	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
216	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
216	1	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
216	1	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
216	1	m,p-Cresol	7.60E-01	mg/kg		3.91E+01	NoA
216	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
216	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
216	1	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
216	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
216	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
216	1	N-Nitroso-di-n-propylamine	7.60E-03	mg/kg		1.89E-02	NoA
216	1	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
216	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
216	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
216	1	Phenanthrene	3.80E-01	mg/kg			NoC
216	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
216	1	Pyridine	7.60E-01	mg/kg		7.82E+00	NoA
216	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
216	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
217	1	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
217	1	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
217	1	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
217	1	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
217	1	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
217	1	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
217	1	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
217	1	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
217	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
217	1	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
217	1	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
217	1	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
217	1	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
217	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
217	1	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
217	1	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
217	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
217	1	2-Nitrophenol	3.60E-01	mg/kg			NoC
217	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
217	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
217	1	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
217	1	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
217	1	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
217	1	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
217	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
217	1	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
217	1	Acenaphthylene	3.60E-01	mg/kg			NoC
217	1	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
217	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
217	1	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
217	1	Benzo(ghi)perylene	3.60E-01	mg/kg			NoC
217	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
217	1	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
217	1	Bis(2-chloroethyl) ether	7.10E-03	mg/kg		2.14E-01	NoA
217	1	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
217	1	Bis(2-ethylhexyl)phthalate	3.60E-01	mg/kg		1.25E+01	NoA
217	1	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
217	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
217	1	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
217	1	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
217	1	Dimethyl phthalate	3.60E-01	mg/kg			NoC
217	1	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
217	1	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
217	1	Fluoranthene	3.60E-01	mg/kg		1.09E+02	NoA
217	1	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
217	1	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
217	1	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
217	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
217	1	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
217	1	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
217	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
217	1	m,p-Cresol	7.10E-01	mg/kg		3.91E+01	NoA
217	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
217	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
217	1	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
217	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
217	1	N-Nitroso-di-n-propylamine	7.10E-03	mg/kg		1.89E-02	NoA
217	1	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
217	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
217	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
217	1	Phenanthrene	3.60E-01	mg/kg			NoC
217	1	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
217	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
217	1	Pyrene	3.60E-01	mg/kg		8.12E+01	NoA
217	1	Pyridine	7.10E-01	mg/kg		7.82E+00	NoA
217	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
217	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
217	2	1,1,1-Trichloroethane	6.00E-03	mg/kg		1.46E+02	NoA
217	2	1,1,2,2-Tetrachloroethane	6.00E-03	mg/kg		5.62E-01	NoA
217	2	1,1,2-Trichloroethane	6.00E-03	mg/kg		2.30E-02	NoA
217	2	1,1-Dichloroethane	6.00E-03	mg/kg		1.34E+00	NoA
217	2	1,1-Dichloroethene	6.00E-03	mg/kg		2.37E-02	NoA
217	2	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
217	2	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
217	2	1,2-Dichloroethane	6.00E-03	mg/kg		1.55E-01	NoA
217	2	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
217	2	1,2-Dichloropropane	6.00E-03	mg/kg		9.40E-01	NoA
217	2	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
217	2	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
217	2	2,4,5-Trichlorophenol	1.80E+00	mg/kg		3.26E+02	NoA
217	2	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
217	2	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
217	2	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
217	2	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
217	2	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
217	2	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
217	2	2-Butanone	1.10E-01	mg/kg		5.78E+02	NoA
217	2	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
217	2	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
217	2	2-Hexanone	5.70E-02	mg/kg		4.05E+00	NoA
217	2	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
217	2	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
217	2	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
217	2	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
217	2	2-Nitrophenol	3.70E-01	mg/kg			NoC
217	2	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
217	2	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
217	2	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
217	2	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
217	2	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
217	2	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
217	2	4-Methyl-2-pentanone	5.70E-02	mg/kg		1.13E+02	NoA
217	2	4-Nitrophenol	1.80E+00	mg/kg			NoC
217	2	Acenaphthene	3.70E-01	mg/kg		1.17E+02	NoA
217	2	Acenaphthylene	3.70E-01	mg/kg			NoC
217	2	Acetone	1.10E-01	mg/kg		1.34E+03	NoA
217	2	Anthracene	3.70E-01	mg/kg		7.47E+02	NoA
217	2	Benzene	6.00E-03	mg/kg		3.33E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
217	2	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
217	2	Benzo(ghi)perylene	3.70E-01	mg/kg			NoC
217	2	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
217	2	Beryllium	5.00E-01	mg/kg	6.70E-01	5.67E-03	NoB
217	2	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
217	2	Bis(2-chloroethyl) ether	3.70E-01	mg/kg		2.14E-01	Yes
217	2	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
217	2	Bis(2-ethylhexyl)phthalate	3.70E-01	mg/kg		1.25E+01	NoA
217	2	Bromodichloromethane	6.00E-03	mg/kg		2.73E-01	NoA
217	2	Bromoform	6.00E-03	mg/kg		2.19E+01	NoA
217	2	Bromomethane	1.10E-02	mg/kg		1.34E-01	NoA
217	2	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
217	2	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
217	2	Carbazole	3.70E-01	mg/kg		8.72E+00	NoA
217	2	Carbon disulfide	6.00E-03	mg/kg		1.48E+01	NoA
217	2	Carbon tetrachloride	6.00E-03	mg/kg		2.39E-01	NoA
217	2	Chlorobenzene	6.00E-03	mg/kg		4.07E+00	NoA
217	2	Chloroethane	1.10E-02	mg/kg		1.45E+03	NoA
217	2	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
217	2	Chloromethane	1.10E-02	mg/kg		1.65E+00	NoA
217	2	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
217	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
217	2	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
217	2	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA
217	2	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
217	2	Dimethyl phthalate	3.70E-01	mg/kg			NoC
217	2	Di-n-butyl phthalate	4.80E-01	mg/kg		3.26E+02	NoA
217	2	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
217	2	Ethylbenzene	6.00E-03	mg/kg		1.58E+00	NoA
217	2	Fluoranthene	3.70E-01	mg/kg		1.09E+02	NoA
217	2	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
217	2	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
217	2	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
217	2	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
217	2	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
217	2	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
217	2	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
217	2	m,p-Cresol	7.10E-01	mg/kg		3.91E+01	NoA
217	2	Methylene chloride	2.00E-02	mg/kg		3.65E+00	NoA
217	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
217	2	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
217	2	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
217	2	N-Nitroso-di-n-propylamine	3.70E-01	mg/kg		1.89E-02	Yes
217	2	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
217	2	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
217	2	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
217	2	Phenanthrene	3.70E-01	mg/kg			NoC
217	2	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
217	2	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
217	2	Pyrene	3.70E-01	mg/kg		8.12E+01	NoA
217	2	Pyridine	7.10E-01	mg/kg		7.82E+00	NoA
217	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
217	2	Styrene	6.00E-03	mg/kg		9.43E+01	NoA
217	2	Tetrachloroethene	6.00E-03	mg/kg		1.13E-01	NoA
217	2	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
217	2	Toluene	6.00E-03	mg/kg		9.61E+01	NoA
217	2	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
217	2	trans-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
217	2	Trichloroethene	6.00E-03	mg/kg		2.34E-02	NoA
217	2	Uranium	2.00E+02	mg/kg	4.90E+00	1.38E+01	Yes
217	2	Vinyl chloride	1.10E-02	mg/kg		8.24E-02	NoA
221	1	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
221	1	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
221	1	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
221	1	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
221	1	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
221	1	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
221	1	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
221	1	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
221	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
221	1	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
221	1	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
221	1	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
221	1	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
221	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
221	1	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
221	1	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
221	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
221	1	2-Nitrophenol	3.50E-01	mg/kg			NoC
221	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
221	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
221	1	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
221	1	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
221	1	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
221	1	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
221	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
221	1	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
221	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
221	1	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
221	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
221	1	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
221	1	Bis(2-chloroethyl) ether	7.00E-03	mg/kg		2.14E-01	NoA
221	1	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
221	1	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
221	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
221	1	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
221	1	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
221	1	Dimethyl phthalate	3.50E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
221	1	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
221	1	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
221	1	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
221	1	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
221	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
221	1	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
221	1	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
221	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
221	1	m,p-Cresol	7.00E-01	mg/kg		3.91E+01	NoA
221	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
221	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
221	1	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
221	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
221	1	N-Nitroso-di-n-propylamine	7.00E-03	mg/kg		1.89E-02	NoA
221	1	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
221	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
221	1	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
221	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
221	1	Pyridine	7.00E-01	mg/kg		7.82E+00	NoA
221	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
221	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
222	1	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
222	1	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
222	1	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
222	1	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
222	1	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
222	1	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
222	1	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
222	1	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
222	1	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
222	1	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
222	1	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
222	1	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
222	1	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
222	1	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
222	1	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
222	1	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
222	1	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
222	1	2-Nitrophenol	4.10E-01	mg/kg			NoC
222	1	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
222	1	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
222	1	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
222	1	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
222	1	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
222	1	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
222	1	4-Nitrophenol	2.00E+00	mg/kg			NoC
222	1	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
222	1	Acenaphthylene	4.10E-01	mg/kg			NoC
222	1	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
222	1	Antimony	7.00E-01	mg/kg	2.10E-01	5.52E-01	Yes
222	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
222	1	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
222	1	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
222	1	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
222	1	Bis(2-chloroethyl) ether	8.20E-03	mg/kg		2.14E-01	NoA
222	1	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
222	1	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
222	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
222	1	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
222	1	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
222	1	Dimethyl phthalate	4.10E-01	mg/kg			NoC
222	1	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
222	1	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
222	1	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
222	1	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
222	1	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
222	1	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
222	1	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
222	1	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
222	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
222	1	m,p-Cresol	8.20E-01	mg/kg		3.91E+01	NoA
222	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
222	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
222	1	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
222	1	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
222	1	N-Nitroso-di-n-propylamine	8.20E-03	mg/kg		1.89E-02	NoA
222	1	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
222	1	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
222	1	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
222	1	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
222	1	Pyridine	8.20E-01	mg/kg		7.82E+00	NoA
222	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
222	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
227	1	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
227	1	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
227	1	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
227	1	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
227	1	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
227	1	1,2,4-Trichlorobenzene	5.00E-01	mg/kg		7.86E-01	NoA
227	1	1,2-Dichlorobenzene	5.00E-01	mg/kg		2.92E+01	NoA
227	1	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
227	1	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
227	1	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
227	1	1,3-Dichlorobenzene	5.00E-01	mg/kg			NoC
227	1	1,4-Dichlorobenzene	5.00E-01	mg/kg		8.13E-01	NoA
227	1	2,4,5-Trichlorophenol	5.00E-01	mg/kg		3.26E+02	NoA
227	1	2,4,6-Trichlorophenol	5.00E-01	mg/kg		3.26E+00	NoA
227	1	2,4-Dichlorophenol	5.00E-01	mg/kg		9.78E+00	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
227	1	2,4-Dimethylphenol	5.00E-01	mg/kg		6.52E+01	NoA
227	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
227	1	2,4-Dinitrotoluene	5.00E-01	mg/kg		5.63E-01	NoA
227	1	2,6-Dinitrotoluene	5.00E-01	mg/kg		3.26E+00	NoA
227	1	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
227	1	2-Chloronaphthalene	5.00E-01	mg/kg		6.26E+02	NoA
227	1	2-Chlorophenol	5.00E-01	mg/kg		3.91E+01	NoA
227	1	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
227	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
227	1	2-Methylnaphthalene	5.00E-01	mg/kg		1.30E+01	NoA
227	1	2-Methylphenol	5.00E-01	mg/kg		1.54E+02	NoA
227	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
227	1	2-Nitrophenol	5.00E-01	mg/kg			NoC
227	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
227	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
227	1	4-Bromophenyl phenyl ether	5.00E-01	mg/kg			NoC
227	1	4-Chloro-3-methylphenol	5.00E-01	mg/kg			NoC
227	1	4-Chlorobenzenamine	5.00E-01	mg/kg		8.66E-01	NoA
227	1	4-Chlorophenyl phenyl ether	5.00E-01	mg/kg			NoC
227	1	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
227	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
227	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
227	1	Acenaphthylene	5.00E-01	mg/kg			NoC
227	1	Acetone	1.00E-02	mg/kg		1.34E+03	NoA
227	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
227	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
227	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
227	1	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
227	1	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
227	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
227	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
227	1	Bis(2-chloroethoxy)methane	5.00E-01	mg/kg		9.78E+00	NoA
227	1	Bis(2-chloroethyl) ether	5.00E-01	mg/kg		2.14E-01	Yes
227	1	Bis(2-chloroisopropyl) ether	5.00E-01	mg/kg		4.57E+00	NoA
227	1	Bis(2-ethylhexyl)phthalate	5.00E-01	mg/kg		1.25E+01	NoA
227	1	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
227	1	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
227	1	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
227	1	Butyl benzyl phthalate	5.00E-01	mg/kg		9.18E+01	NoA
227	1	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
227	1	Carbazole	5.00E-01	mg/kg		8.72E+00	NoA
227	1	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
227	1	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
227	1	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
227	1	Cobalt	2.50E+00	mg/kg	1.40E+01	1.37E+00	NoB
227	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
227	1	Dibenzofuran	5.00E-01	mg/kg		3.26E+00	NoA
227	1	Diethyl phthalate	5.00E-01	mg/kg		2.61E+03	NoA
227	1	Dimethyl phthalate	5.00E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
227	1	Di-n-butyl phthalate	5.00E-01	mg/kg		3.26E+02	NoA
227	1	Di-n-octylphthalate	5.00E-01	mg/kg		1.30E+02	NoA
227	1	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
227	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
227	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
227	1	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
227	1	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
227	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
227	1	Hexachloroethane	5.00E-01	mg/kg		2.28E+00	NoA
227	1	Isophorone	5.00E-01	mg/kg		1.82E+02	NoA
227	1	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
227	1	m,p-Cresol	7.10E-01	mg/kg		3.91E+01	NoA
227	1	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
227	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
227	1	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
227	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
227	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
227	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
227	1	N-Nitroso-di-n-propylamine	5.00E-01	mg/kg		1.89E-02	Yes
227	1	N-Nitrosodiphenylamine	5.00E-01	mg/kg		3.22E+01	NoA
227	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
227	1	Phenanthrene	5.00E-01	mg/kg			NoC
227	1	Phenol	5.00E-01	mg/kg		4.98E+02	NoA
227	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
227	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
227	1	Pyridine	7.10E-01	mg/kg		7.82E+00	NoA
227	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
227	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
227	1	Sodium	9.38E+01	mg/kg	3.20E+02		NoBE
227	1	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
227	1	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
227	1	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
227	1	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
227	1	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
227	1	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
227	1	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
227	1	Zinc	2.00E+01	mg/kg	6.50E+01	1.38E+03	NoAB
227	2	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
227	2	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
227	2	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
227	2	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
227	2	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
227	2	1,2,4-Trichlorobenzene	4.80E-01	mg/kg		7.86E-01	NoA
227	2	1,2-Dichlorobenzene	4.80E-01	mg/kg		2.92E+01	NoA
227	2	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
227	2	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
227	2	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
227	2	1,3-Dichlorobenzene	4.80E-01	mg/kg			NoC
227	2	1,4-Dichlorobenzene	4.80E-01	mg/kg		8.13E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
227	2	2,4,5-Trichlorophenol	4.80E-01	mg/kg		3.26E+02	NoA
227	2	2,4,6-Trichlorophenol	4.80E-01	mg/kg		3.26E+00	NoA
227	2	2,4-Dichlorophenol	4.80E-01	mg/kg		9.78E+00	NoA
227	2	2,4-Dimethylphenol	4.80E-01	mg/kg		6.52E+01	NoA
227	2	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
227	2	2,4-Dinitrotoluene	4.80E-01	mg/kg		5.63E-01	NoA
227	2	2,6-Dinitrotoluene	4.80E-01	mg/kg		3.26E+00	NoA
227	2	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
227	2	2-Chloronaphthalene	4.80E-01	mg/kg		6.26E+02	NoA
227	2	2-Chlorophenol	4.80E-01	mg/kg		3.91E+01	NoA
227	2	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
227	2	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
227	2	2-Methylnaphthalene	4.80E-01	mg/kg		1.30E+01	NoA
227	2	2-Methylphenol	4.80E-01	mg/kg		1.54E+02	NoA
227	2	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
227	2	2-Nitrophenol	4.80E-01	mg/kg			NoC
227	2	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
227	2	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
227	2	4-Bromophenyl phenyl ether	4.80E-01	mg/kg			NoC
227	2	4-Chloro-3-methylphenol	4.80E-01	mg/kg			NoC
227	2	4-Chlorobenzenamine	4.80E-01	mg/kg		8.66E-01	NoA
227	2	4-Chlorophenyl phenyl ether	4.80E-01	mg/kg			NoC
227	2	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
227	2	4-Nitrophenol	1.70E+00	mg/kg			NoC
227	2	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
227	2	Acenaphthylene	5.00E-01	mg/kg			NoC
227	2	Acetone	1.00E-02	mg/kg		1.34E+03	NoA
227	2	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
227	2	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
227	2	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
227	2	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
227	2	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
227	2	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
227	2	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
227	2	Bis(2-chloroethoxy)methane	4.80E-01	mg/kg		9.78E+00	NoA
227	2	Bis(2-chloroethyl) ether	4.80E-01	mg/kg		2.14E-01	Yes
227	2	Bis(2-chloroisopropyl) ether	4.80E-01	mg/kg		4.57E+00	NoA
227	2	Bis(2-ethylhexyl)phthalate	4.80E-01	mg/kg		1.25E+01	NoA
227	2	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
227	2	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
227	2	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
227	2	Butyl benzyl phthalate	4.80E-01	mg/kg		9.18E+01	NoA
227	2	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
227	2	Carbazole	4.80E-01	mg/kg		8.72E+00	NoA
227	2	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
227	2	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
227	2	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
227	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
227	2	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
227	2	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
227	2	Dimethyl phthalate	3.40E-01	mg/kg			NoC
227	2	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
227	2	Di-n-octylphthalate	4.80E-01	mg/kg		1.30E+02	NoA
227	2	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
227	2	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
227	2	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
227	2	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
227	2	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
227	2	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
227	2	Hexachloroethane	4.80E-01	mg/kg		2.28E+00	NoA
227	2	Isophorone	4.80E-01	mg/kg		1.82E+02	NoA
227	2	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
227	2	m,p-Cresol	6.90E-01	mg/kg		3.91E+01	NoA
227	2	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
227	2	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
227	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
227	2	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
227	2	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
227	2	N-Nitroso-di-n-propylamine	4.80E-01	mg/kg		1.89E-02	Yes
227	2	N-Nitrosodiphenylamine	4.80E-01	mg/kg		3.22E+01	NoA
227	2	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
227	2	Phenanthrene	5.00E-01	mg/kg			NoC
227	2	Phenol	4.80E-01	mg/kg		4.98E+02	NoA
227	2	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
227	2	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
227	2	Pyridine	6.90E-01	mg/kg		7.82E+00	NoA
227	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
227	2	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
227	2	Sodium	9.94E+01	mg/kg	3.20E+02		NoBE
227	2	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
227	2	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
227	2	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
227	2	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
227	2	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
227	2	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
227	2	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
228	1	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
228	1	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
228	1	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
228	1	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
228	1	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
228	1	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
228	1	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
228	1	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
228	1	2,4-Dinitrophenol	1.60E+00	mg/kg		6.52E+00	NoA
228	1	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
228	1	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
228	1	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
228	1	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
228	1	2-Methyl-4,6-dinitrophenol	1.60E+00	mg/kg		2.61E-01	Yes
228	1	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
228	1	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
228	1	2-Nitrobenzenamine	1.60E+00	mg/kg		2.96E-01	Yes
228	1	2-Nitrophenol	3.40E-01	mg/kg			NoC
228	1	3,3'-Dichlorobenzidine	1.60E+00	mg/kg		3.85E-01	Yes
228	1	3-Nitrobenzenamine	1.60E+00	mg/kg		9.78E-01	Yes
228	1	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
228	1	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
228	1	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
228	1	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
228	1	4-Nitrophenol	1.60E+00	mg/kg			NoC
228	1	Acenaphthene	3.40E-01	mg/kg		1.17E+02	NoA
228	1	Acenaphthylene	3.40E-01	mg/kg			NoC
228	1	Anthracene	3.40E-01	mg/kg		7.47E+02	NoA
228	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
228	1	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
228	1	Benzoic acid	1.60E+00	mg/kg		1.30E+04	NoA
228	1	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
228	1	Bis(2-chloroethyl) ether	6.80E-03	mg/kg		2.14E-01	NoA
228	1	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
228	1	Bis(2-ethylhexyl)phthalate	3.40E-01	mg/kg		1.25E+01	NoA
228	1	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
228	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
228	1	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
228	1	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
228	1	Dimethyl phthalate	3.40E-01	mg/kg			NoC
228	1	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
228	1	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
228	1	Fluorene	3.40E-01	mg/kg		9.15E+01	NoA
228	1	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
228	1	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
228	1	Hexachlorocyclopentadiene	1.60E+00	mg/kg		1.95E+01	NoA
228	1	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
228	1	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
228	1	m,p-Cresol	6.80E-01	mg/kg		3.91E+01	NoA
228	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
228	1	Naphthalene	3.40E-01	mg/kg		1.15E+00	NoA
228	1	Nitrobenzene	1.60E+00	mg/kg		4.79E+00	NoA
228	1	N-Nitroso-di-n-propylamine	6.80E-03	mg/kg		1.89E-02	NoA
228	1	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
228	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
228	1	Pentachlorophenol	1.60E+00	mg/kg		4.36E-01	Yes
228	1	Phenanthrene	3.40E-01	mg/kg			NoC
228	1	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
228	1	p-Nitroaniline	1.60E+00	mg/kg		8.66E+00	NoA
228	1	Pyridine	6.80E-01	mg/kg		7.82E+00	NoA
228	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
76	1	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
76	1	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
76	1	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
76	1	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
76	1	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
76	1	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
76	1	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
76	1	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
76	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
76	1	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
76	1	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
76	1	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
76	1	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
76	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
76	1	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
76	1	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
76	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
76	1	2-Nitrophenol	3.60E-01	mg/kg			NoC
76	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
76	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
76	1	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
76	1	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
76	1	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
76	1	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
76	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
76	1	Antimony	5.70E-01	mg/kg	2.10E-01	5.52E-01	Yes
76	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
76	1	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
76	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
76	1	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
76	1	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
76	1	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
76	1	Bis(2-ethylhexyl)phthalate	8.10E-02	mg/kg		1.25E+01	NoA
76	1	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
76	1	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
76	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
76	1	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
76	1	Dimethyl phthalate	3.60E-01	mg/kg			NoC
76	1	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
76	1	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
76	1	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
76	1	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
76	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
76	1	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
76	1	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
76	1	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA
76	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
76	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
76	1	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
76	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
76	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
76	1	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
76	1	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
76	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
76	1	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
76	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
76	1	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
76	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
76	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
76	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
165	1	1,1,1-Trichloroethane	6.10E-01	mg/kg		1.46E+02	NoA
165	1	1,1,2,2-Tetrachloroethane	1.10E-02	mg/kg		5.62E-01	NoA
165	1	1,1,2-Trichloroethane	1.10E-02	mg/kg		2.30E-02	NoA
165	1	1,1-Dichloroethane	1.10E-02	mg/kg		1.34E+00	NoA
165	1	1,1-Dichloroethene	6.10E-01	mg/kg		2.37E-02	Yes
165	1	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
165	1	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
165	1	1,2-Dichloroethane	6.10E-01	mg/kg		1.55E-01	Yes
165	1	1,2-Dichloroethene	1.10E-02	mg/kg		1.24E+00	NoA
165	1	1,2-Dichloropropane	1.10E-02	mg/kg		9.40E-01	NoA
165	1	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
165	1	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
165	1	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
165	1	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
165	1	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
165	1	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
165	1	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
165	1	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
165	1	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
165	1	2-Butanone	1.20E+01	mg/kg		5.78E+02	NoA
165	1	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
165	1	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
165	1	2-Hexanone	5.60E-02	mg/kg		4.05E+00	NoA
165	1	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
165	1	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
165	1	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
165	1	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
165	1	2-Nitrophenol	3.70E-01	mg/kg			NoC
165	1	3,3'-Dichlorobenzidine	7.50E-01	mg/kg		3.85E-01	Yes
165	1	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
165	1	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
165	1	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
165	1	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
165	1	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
165	1	4-Methyl-2-pentanone	1.20E+01	mg/kg		1.13E+02	NoA
165	1	4-Nitrophenol	1.90E+00	mg/kg			NoC
165	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
165	1	Acenaphthylene	5.00E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
165	1	Acetone	1.20E+01	mg/kg		1.34E+03	NoA
165	1	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
165	1	Benzene	6.10E-01	mg/kg		3.33E-01	Yes
165	1	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
165	1	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
165	1	Bis(2-chloroethyl) ether	3.70E-01	mg/kg		2.14E-01	Yes
165	1	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
165	1	Bis(2-ethylhexyl)phthalate	3.70E-01	mg/kg		1.25E+01	NoA
165	1	Bromodichloromethane	1.10E-02	mg/kg		2.73E-01	NoA
165	1	Bromoform	1.10E-02	mg/kg		2.19E+01	NoA
165	1	Bromomethane	2.10E-02	mg/kg		1.34E-01	NoA
165	1	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
165	1	Cadmium	5.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
165	1	Carbazole	3.60E-01	mg/kg		8.72E+00	NoA
165	1	Carbon disulfide	1.10E-02	mg/kg		1.48E+01	NoA
165	1	Carbon tetrachloride	6.10E-01	mg/kg		2.39E-01	Yes
165	1	Chlorobenzene	6.10E-01	mg/kg		4.07E+00	NoA
165	1	Chloroethane	2.10E-02	mg/kg		1.45E+03	NoA
165	1	Chloroform	6.10E-01	mg/kg		1.22E-01	Yes
165	1	Chloromethane	2.10E-02	mg/kg		1.65E+00	NoA
165	1	cis-1,3-Dichloropropene	1.10E-02	mg/kg			NoC
165	1	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
165	1	Dibromochloromethane	1.10E-02	mg/kg		2.42E-01	NoA
165	1	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
165	1	Dimethyl phthalate	3.70E-01	mg/kg			NoC
165	1	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
165	1	Ethylbenzene	6.10E-01	mg/kg		1.58E+00	NoA
165	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
165	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
165	1	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
165	1	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
165	1	Hexachlorocyclopentadiene	3.70E-01	mg/kg		1.95E+01	NoA
165	1	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
165	1	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
165	1	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
165	1	Methylene chloride	6.10E-01	mg/kg		3.65E+00	NoA
165	1	Molybdenum	4.90E+00	mg/kg		2.30E+01	NoA
165	1	Nitrobenzene	3.70E-01	mg/kg		4.79E+00	NoA
165	1	N-Nitroso-di-n-propylamine	3.70E-01	mg/kg		1.89E-02	Yes
165	1	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
165	1	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
165	1	Phenanthrene	4.90E-01	mg/kg			NoC
165	1	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
165	1	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
165	1	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
165	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
165	1	Styrene	1.10E-02	mg/kg		9.43E+01	NoA
165	1	Tetrachloroethene	6.10E-01	mg/kg		1.13E-01	Yes
165	1	Thallium	1.96E+01	mg/kg	2.10E-01	3.68E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
165	1	Toluene	6.10E-01	mg/kg		9.61E+01	NoA
165	1	Total Xylene	1.20E+00	mg/kg		7.96E+00	NoA
165	1	trans-1,3-Dichloropropene	1.10E-02	mg/kg			NoC
165	1	Trichloroethene	6.10E-01	mg/kg		2.34E-02	Yes
165	1	Vinyl acetate	2.10E-02	mg/kg		1.83E+01	NoA
165	1	Vinyl chloride	2.10E-02	mg/kg		8.24E-02	NoA
170	1	PCB, Total	1.00E-01	mg/kg		6.48E-02	Yes
158	1	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
158	1	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
158	1	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
158	1	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
158	1	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
158	1	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
158	1	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
158	1	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
158	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
158	1	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
158	1	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
158	1	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
158	1	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
158	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
158	1	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
158	1	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
158	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
158	1	2-Nitrophenol	3.70E-01	mg/kg			NoC
158	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
158	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
158	1	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
158	1	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
158	1	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
158	1	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
158	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
158	1	Acenaphthene	3.70E-01	mg/kg		1.17E+02	NoA
158	1	Acenaphthylene	3.70E-01	mg/kg			NoC
158	1	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
158	1	Benzenemethanol	3.70E-01	mg/kg		3.26E+02	NoA
158	1	Benzo(ghi)perylene	3.60E-01	mg/kg			NoC
158	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
158	1	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
158	1	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
158	1	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
158	1	Bis(2-ethylhexyl)phthalate	3.70E-01	mg/kg		1.25E+01	NoA
158	1	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
158	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
158	1	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
158	1	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
158	1	Dimethyl phthalate	3.70E-01	mg/kg			NoC
158	1	Di-n-butyl phthalate	3.70E-01	mg/kg		3.26E+02	NoA
158	1	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
158	1	Fluoranthene	3.60E-01	mg/kg		1.09E+02	NoA
158	1	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
158	1	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
158	1	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
158	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
158	1	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
158	1	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
158	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
158	1	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA
158	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
158	1	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
158	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
158	1	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
158	1	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
158	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
158	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
158	1	Phenanthrene	3.60E-01	mg/kg			NoC
158	1	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
158	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
158	1	Pyrene	3.60E-01	mg/kg		8.12E+01	NoA
158	1	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
158	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
158	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
169	1	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
169	1	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
169	1	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
169	1	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
169	1	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
169	1	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
169	1	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
169	1	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
169	1	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
169	1	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
169	1	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
169	1	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
169	1	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
169	1	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
169	1	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
169	1	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
169	1	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
169	1	2-Nitrophenol	3.80E-01	mg/kg			NoC
169	1	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
169	1	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
169	1	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
169	1	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
169	1	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
169	1	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
169	1	4-Nitrophenol	1.90E+00	mg/kg			NoC
169	1	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
169	1	Acenaphthylene	3.80E-01	mg/kg			NoC
169	1	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
169	1	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
169	1	Bis(2-chloroethyl) ether	7.60E-03	mg/kg		2.14E-01	NoA
169	1	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
169	1	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
169	1	Cadmium	1.10E+00	mg/kg	2.10E-01	8.11E-01	Yes
169	1	Cobalt	9.90E+00	mg/kg	1.40E+01	1.37E+00	NoB
169	1	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
169	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
169	1	Dimethyl phthalate	3.80E-01	mg/kg			NoC
169	1	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
169	1	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
169	1	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
169	1	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
169	1	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
169	1	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
169	1	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
169	1	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
169	1	m,p-Cresol	7.60E-01	mg/kg		3.91E+01	NoA
169	1	Manganese	8.50E+01	mg/kg	1.50E+03	4.19E+02	NoAB
169	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
169	1	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
169	1	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
169	1	N-Nitroso-di-n-propylamine	7.60E-03	mg/kg		1.89E-02	NoA
169	1	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
169	1	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
169	1	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
169	1	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
169	1	Pyridine	7.60E-01	mg/kg		7.82E+00	NoA
169	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
169	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
19	1	Acenaphthene	1.00E+00	mg/kg		1.17E+02	NoA
19	1	Acenaphthylene	1.00E+00	mg/kg			NoC
19	1	Anthracene	6.70E-01	mg/kg		7.47E+02	NoA
19	1	Antimony	9.81E+01	mg/kg	2.10E-01	5.52E-01	Yes
19	1	Chromium	2.96E+01	mg/kg	1.60E+01	1.56E+01	Yes
19	1	Cobalt	4.76E+01	mg/kg	1.40E+01	1.37E+00	Yes
19	1	Fluorene	1.00E+00	mg/kg		9.15E+01	NoA
19	1	Mercury	2.00E-02	mg/kg	2.00E-01	2.13E-01	NoAB
19	1	Naphthalene	6.70E-01	mg/kg		1.15E+00	NoA
19	1	Nickel	1.68E+01	mg/kg	2.10E+01	1.04E+01	NoB
19	1	Selenium	2.50E-01	mg/kg	8.00E-01	2.30E+01	NoAB
19	1	Silver	9.90E+00	mg/kg	2.30E+00	2.61E+00	Yes
19	1	Trichloroethene	5.00E-03	mg/kg		2.34E-02	NoA
138	1	1,1,1-Trichloroethane	1.00E+00	mg/kg		1.46E+02	NoA
138	1	1,2,4-Trichlorobenzene	4.30E-01	mg/kg		7.86E-01	NoA
138	1	1,2-Dichlorobenzene	4.30E-01	mg/kg		2.92E+01	NoA
138	1	1,3-Dichlorobenzene	4.30E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
138	1	1,4-Dichlorobenzene	4.30E-01	mg/kg		8.13E-01	NoA
138	1	2,4,5-Trichlorophenol	4.30E-01	mg/kg		3.26E+02	NoA
138	1	2,4,6-Trichlorophenol	4.30E-01	mg/kg		3.26E+00	NoA
138	1	2,4-Dichlorophenol	4.30E-01	mg/kg		9.78E+00	NoA
138	1	2,4-Dimethylphenol	4.30E-01	mg/kg		6.52E+01	NoA
138	1	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
138	1	2,4-Dinitrotoluene	4.30E-01	mg/kg		5.63E-01	NoA
138	1	2,6-Dinitrotoluene	4.30E-01	mg/kg		3.26E+00	NoA
138	1	2-Chloronaphthalene	4.30E-01	mg/kg		6.26E+02	NoA
138	1	2-Chlorophenol	4.30E-01	mg/kg		3.91E+01	NoA
138	1	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
138	1	2-Methylnaphthalene	4.30E-01	mg/kg		1.30E+01	NoA
138	1	2-Methylphenol	4.30E-01	mg/kg		1.54E+02	NoA
138	1	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
138	1	2-Nitrophenol	4.30E-01	mg/kg			NoC
138	1	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
138	1	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
138	1	4-Bromophenyl phenyl ether	4.30E-01	mg/kg			NoC
138	1	4-Chloro-3-methylphenol	4.30E-01	mg/kg			NoC
138	1	4-Chlorobenzeneamine	4.30E-01	mg/kg		8.66E-01	NoA
138	1	4-Chlorophenyl phenyl ether	4.30E-01	mg/kg			NoC
138	1	4-Nitrophenol	2.10E+00	mg/kg			NoC
138	1	Acenaphthene	4.30E-01	mg/kg		1.17E+02	NoA
138	1	Acenaphthylene	4.30E-01	mg/kg			NoC
138	1	Anthracene	4.30E-01	mg/kg		7.47E+02	NoA
138	1	Benzenemethanol	4.30E-01	mg/kg		3.26E+02	NoA
138	1	Benzo(ghi)perylene	4.30E-01	mg/kg			NoC
138	1	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
138	1	Bis(2-chloroethoxy)methane	4.30E-01	mg/kg		9.78E+00	NoA
138	1	Bis(2-chloroethyl) ether	8.60E-03	mg/kg		2.14E-01	NoA
138	1	Bis(2-chloroisopropyl) ether	4.30E-01	mg/kg		4.57E+00	NoA
138	1	Bis(2-ethylhexyl)phthalate	4.30E-01	mg/kg		1.25E+01	NoA
138	1	Butyl benzyl phthalate	4.30E-01	mg/kg		9.18E+01	NoA
138	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
138	1	Dibenzofuran	4.30E-01	mg/kg		3.26E+00	NoA
138	1	Diethyl phthalate	4.30E-01	mg/kg		2.61E+03	NoA
138	1	Dimethyl phthalate	4.30E-01	mg/kg			NoC
138	1	Di-n-butyl phthalate	4.30E-01	mg/kg		3.26E+02	NoA
138	1	Di-n-octylphthalate	4.30E-01	mg/kg		1.30E+02	NoA
138	1	Fluorene	4.30E-01	mg/kg		9.15E+01	NoA
138	1	Hexachlorobenzene	4.30E-01	mg/kg		4.92E-02	Yes
138	1	Hexachlorobutadiene	4.30E-01	mg/kg		2.22E+00	NoA
138	1	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
138	1	Hexachloroethane	4.30E-01	mg/kg		2.28E+00	NoA
138	1	Isophorone	4.30E-01	mg/kg		1.82E+02	NoA
138	1	m,p-Cresol	8.60E-01	mg/kg		3.91E+01	NoA
138	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
138	1	Naphthalene	4.30E-01	mg/kg		1.15E+00	NoA
138	1	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
138	1	N-Nitroso-di-n-propylamine	8.60E-03	mg/kg		1.89E-02	NoA
138	1	N-Nitrosodiphenylamine	4.30E-01	mg/kg		3.22E+01	NoA
138	1	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
138	1	Phenol	4.30E-01	mg/kg		4.98E+02	NoA
138	1	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
138	1	Pyridine	8.60E-01	mg/kg		7.82E+00	NoA
138	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
138	1	Thallium	5.00E+00	mg/kg	2.10E-01	3.68E-01	Yes
138	1	Trichloroethene	1.00E+00	mg/kg		2.34E-02	Yes
138	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
138	2	1,1-Dichloroethene	1.00E+00	mg/kg		2.37E-02	Yes
138	2	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
138	2	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
138	2	1,2-Dichloroethane	1.00E+00	mg/kg		1.55E-01	Yes
138	2	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
138	2	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
138	2	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
138	2	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
138	2	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
138	2	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
138	2	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
138	2	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
138	2	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
138	2	2-Butanone	1.10E+00	mg/kg		5.78E+02	NoA
138	2	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
138	2	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
138	2	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
138	2	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
138	2	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
138	2	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
138	2	2-Nitrophenol	3.80E-01	mg/kg			NoC
138	2	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
138	2	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
138	2	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
138	2	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
138	2	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
138	2	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
138	2	4-Nitrophenol	1.80E+00	mg/kg			NoC
138	2	Acenaphthene	2.50E+00	mg/kg		1.17E+02	NoA
138	2	Acenaphthylene	2.50E+00	mg/kg			NoC
138	2	Anthracene	2.50E+00	mg/kg		7.47E+02	NoA
138	2	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
138	2	Benzene	1.00E+00	mg/kg		3.33E-01	Yes
138	2	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
138	2	Benzo(ghi)perylene	2.50E+00	mg/kg			NoC
138	2	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
138	2	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
138	2	Bis(2-chloroethyl) ether	7.60E-03	mg/kg		2.14E-01	NoA
138	2	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
138	2	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
138	2	Carbon tetrachloride	1.00E+00	mg/kg		2.39E-01	Yes
138	2	Chlorobenzene	1.00E+00	mg/kg		4.07E+00	NoA
138	2	Chloroform	1.00E+00	mg/kg		1.22E-01	Yes
138	2	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
138	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
138	2	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
138	2	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
138	2	Dimethyl phthalate	3.80E-01	mg/kg			NoC
138	2	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
138	2	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
138	2	Fluoranthene	2.50E+00	mg/kg		1.09E+02	NoA
138	2	Fluorene	2.50E+00	mg/kg		9.15E+01	NoA
138	2	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
138	2	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
138	2	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
138	2	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
138	2	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
138	2	m,p-Cresol	7.60E-01	mg/kg		3.91E+01	NoA
138	2	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
138	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
138	2	Naphthalene	2.50E+00	mg/kg		1.15E+00	Yes
138	2	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
138	2	N-Nitroso-di-n-propylamine	7.60E-03	mg/kg		1.89E-02	NoA
138	2	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
138	2	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
138	2	Phenanthrene	2.50E+00	mg/kg			NoC
138	2	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
138	2	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
138	2	Pyrene	2.50E+00	mg/kg		8.12E+01	NoA
138	2	Pyridine	7.60E-01	mg/kg		7.82E+00	NoA
138	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
138	2	Tetrachloroethene	1.00E+00	mg/kg		1.13E-01	Yes
138	2	Trichloroethene	1.00E+00	mg/kg		2.34E-02	Yes
138	2	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
138	2	Vinyl chloride	1.10E+00	mg/kg		8.24E-02	Yes
180	1	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
180	1	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
180	1	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
180	1	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
180	1	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
180	1	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
180	1	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
180	1	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
180	1	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
180	1	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
180	1	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
180	1	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
180	1	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
180	1	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
180	1	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
180	1	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
180	1	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
180	1	2-Nitrophenol	4.20E-01	mg/kg			NoC
180	1	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
180	1	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
180	1	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
180	1	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
180	1	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
180	1	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
180	1	4-Nitrophenol	2.10E+00	mg/kg			NoC
180	1	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
180	1	Acenaphthylene	4.20E-01	mg/kg			NoC
180	1	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
180	1	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
180	1	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
180	1	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
180	1	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
180	1	Bis(2-chloroethyl) ether	8.50E-03	mg/kg		2.14E-01	NoA
180	1	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
180	1	Bis(2-ethylhexyl)phthalate	4.20E-01	mg/kg		1.25E+01	NoA
180	1	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
180	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
180	1	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
180	1	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
180	1	Dimethyl phthalate	4.20E-01	mg/kg			NoC
180	1	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
180	1	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
180	1	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
180	1	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
180	1	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
180	1	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
180	1	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
180	1	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
180	1	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
180	1	m,p-Cresol	8.50E-01	mg/kg		3.91E+01	NoA
180	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
180	1	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
180	1	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
180	1	N-Nitroso-di-n-propylamine	8.50E-03	mg/kg		1.89E-02	NoA
180	1	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
180	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
180	1	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
180	1	Phenanthrene	4.20E-01	mg/kg			NoC
180	1	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
180	1	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
180	1	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
180	1	Pyridine	8.50E-01	mg/kg		7.82E+00	NoA

A = <Child Resident NAL C = no NAL available
B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
180	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
180	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
180	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
180	2	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
180	2	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
180	2	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
180	2	1,4-Dichlorobenzene	4.40E-01	mg/kg		8.13E-01	NoA
180	2	2,4,5-Trichlorophenol	4.40E-01	mg/kg		3.26E+02	NoA
180	2	2,4,6-Trichlorophenol	4.40E-01	mg/kg		3.26E+00	NoA
180	2	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
180	2	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
180	2	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
180	2	2,4-Dinitrotoluene	4.40E-01	mg/kg		5.63E-01	NoA
180	2	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
180	2	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA
180	2	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
180	2	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
180	2	2-Methylnaphthalene	4.40E-01	mg/kg		1.30E+01	NoA
180	2	2-Methylphenol	4.40E-01	mg/kg		1.54E+02	NoA
180	2	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
180	2	2-Nitrophenol	4.40E-01	mg/kg			NoC
180	2	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
180	2	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
180	2	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
180	2	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
180	2	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
180	2	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
180	2	4-Nitrophenol	2.10E+00	mg/kg			NoC
180	2	Acenaphthene	4.40E-01	mg/kg		1.17E+02	NoA
180	2	Acenaphthylene	4.40E-01	mg/kg			NoC
180	2	Anthracene	4.40E-01	mg/kg		7.47E+02	NoA
180	2	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
180	2	Benzo(ghi)perylene	4.40E-01	mg/kg			NoC
180	2	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
180	2	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
180	2	Bis(2-chloroethyl) ether	8.90E-03	mg/kg		2.14E-01	NoA
180	2	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA
180	2	Bis(2-ethylhexyl)phthalate	4.40E-01	mg/kg		1.25E+01	NoA
180	2	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
180	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
180	2	Dibenzofuran	4.40E-01	mg/kg		3.26E+00	NoA
180	2	Diethyl phthalate	4.40E-01	mg/kg		2.61E+03	NoA
180	2	Dimethyl phthalate	4.40E-01	mg/kg			NoC
180	2	Di-n-butyl phthalate	4.40E-01	mg/kg		3.26E+02	NoA
180	2	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA
180	2	Fluorene	4.40E-01	mg/kg		9.15E+01	NoA
180	2	Hexachlorobenzene	4.40E-01	mg/kg		4.92E-02	Yes
180	2	Hexachlorobutadiene	4.40E-01	mg/kg		2.22E+00	NoA
180	2	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
180	2	Hexachloroethane	4.40E-01	mg/kg		2.28E+00	NoA
180	2	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
180	2	m,p-Cresol	8.90E-01	mg/kg		3.91E+01	NoA
180	2	Manganese	8.50E+01	mg/kg	1.50E+03	4.19E+02	NoAB
180	2	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
180	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
180	2	Naphthalene	4.40E-01	mg/kg		1.15E+00	NoA
180	2	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
180	2	N-Nitroso-di-n-propylamine	8.90E-03	mg/kg		1.89E-02	NoA
180	2	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
180	2	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
180	2	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
180	2	Phenanthrene	4.40E-01	mg/kg			NoC
180	2	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
180	2	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
180	2	Pyridine	8.90E-01	mg/kg		7.82E+00	NoA
180	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
180	2	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
180	2	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
180	3	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
180	3	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
180	3	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
180	3	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
180	3	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
180	3	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
180	3	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
180	3	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
180	3	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
180	3	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
180	3	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
180	3	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
180	3	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
180	3	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
180	3	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
180	3	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
180	3	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
180	3	2-Nitrophenol	3.90E-01	mg/kg			NoC
180	3	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
180	3	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
180	3	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
180	3	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
180	3	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
180	3	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
180	3	4-Nitrophenol	1.90E+00	mg/kg			NoC
180	3	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
180	3	Acenaphthylene	3.90E-01	mg/kg			NoC
180	3	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
180	3	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
180	3	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
180	3	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
180	3	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
180	3	Bis(2-chloroethyl) ether	7.80E-03	mg/kg		2.14E-01	NoA
180	3	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
180	3	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
180	3	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
180	3	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
180	3	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
180	3	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
180	3	Dimethyl phthalate	3.90E-01	mg/kg			NoC
180	3	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
180	3	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
180	3	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
180	3	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
180	3	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
180	3	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
180	3	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
180	3	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
180	3	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
180	3	m,p-Cresol	7.80E-01	mg/kg		3.91E+01	NoA
180	3	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
180	3	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
180	3	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
180	3	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
180	3	N-Nitroso-di-n-propylamine	7.80E-03	mg/kg		1.89E-02	NoA
180	3	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
180	3	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
180	3	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
180	3	Phenanthrene	3.90E-01	mg/kg			NoC
180	3	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
180	3	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
180	3	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
180	3	Pyridine	7.80E-01	mg/kg		7.82E+00	NoA
180	3	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
180	3	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
180	4	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
180	4	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
180	4	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
180	4	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
180	4	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
180	4	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
180	4	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
180	4	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
180	4	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
180	4	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
180	4	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
180	4	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
180	4	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
180	4	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
180	4	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA
180	4	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
180	4	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
180	4	2-Nitrophenol	3.90E-01	mg/kg			NoC
180	4	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
180	4	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
180	4	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
180	4	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
180	4	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
180	4	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
180	4	4-Nitrophenol	1.90E+00	mg/kg			NoC
180	4	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
180	4	Acenaphthylene	3.90E-01	mg/kg			NoC
180	4	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
180	4	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
180	4	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC
180	4	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
180	4	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
180	4	Bis(2-chloroethyl) ether	7.90E-03	mg/kg		2.14E-01	NoA
180	4	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
180	4	Bis(2-ethylhexyl)phthalate	3.90E-01	mg/kg		1.25E+01	NoA
180	4	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
180	4	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
180	4	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
180	4	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
180	4	Dimethyl phthalate	3.90E-01	mg/kg			NoC
180	4	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
180	4	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
180	4	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
180	4	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
180	4	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
180	4	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
180	4	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
180	4	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
180	4	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
180	4	m,p-Cresol	7.90E-01	mg/kg		3.91E+01	NoA
180	4	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
180	4	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
180	4	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
180	4	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
180	4	N-Nitroso-di-n-propylamine	7.90E-03	mg/kg		1.89E-02	NoA
180	4	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
180	4	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
180	4	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
180	4	Phenanthrene	3.90E-01	mg/kg			NoC
180	4	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
180	4	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
180	4	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
180	4	Pyridine	7.90E-01	mg/kg		7.82E+00	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
180	4	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
180	4	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
181	1	Acenaphthene	8.10E-03	mg/kg		1.17E+02	NoA
181	1	Acenaphthylene	8.10E-03	mg/kg			NoC
181	1	Anthracene	8.10E-03	mg/kg		7.47E+02	NoA
181	1	Antimony	8.34E+00	mg/kg	2.10E-01	5.52E-01	Yes
181	1	Arsenic	4.97E+00	mg/kg	1.20E+01	2.38E-01	NoB
181	1	Beryllium	4.97E-01	mg/kg	6.70E-01	5.67E-03	NoB
181	1	Cadmium	2.49E+00	mg/kg	2.10E-01	8.11E-01	Yes
181	1	Fluorene	8.10E-03	mg/kg		9.15E+01	NoA
181	1	Molybdenum	4.97E+00	mg/kg		2.30E+01	NoA
181	1	PCB, Total	1.30E-01	mg/kg		6.48E-02	Yes
181	1	PCB, Total	2.00E-02	mg/kg		6.62E-02	NoA
181	1	Selenium	4.97E+00	mg/kg	8.00E-01	2.30E+01	NoA
181	1	Silver	2.08E+00	mg/kg	2.30E+00	2.61E+00	NoAB
181	1	Sodium	1.99E+02	mg/kg	3.20E+02		NoBE
181	1	Uranium	4.97E+00	mg/kg	4.90E+00	1.38E+01	NoA
195	1	1,2,4-Trichlorobenzene	4.50E-01	mg/kg		7.86E-01	NoA
195	1	1,2-Dichlorobenzene	4.50E-01	mg/kg		2.92E+01	NoA
195	1	1,3-Dichlorobenzene	4.50E-01	mg/kg			NoC
195	1	1,4-Dichlorobenzene	4.50E-01	mg/kg		8.13E-01	NoA
195	1	2,4,5-Trichlorophenol	4.50E-01	mg/kg		3.26E+02	NoA
195	1	2,4,6-Trichlorophenol	4.50E-01	mg/kg		3.26E+00	NoA
195	1	2,4-Dichlorophenol	4.50E-01	mg/kg		9.78E+00	NoA
195	1	2,4-Dimethylphenol	4.50E-01	mg/kg		6.52E+01	NoA
195	1	2,4-Dinitrophenol	2.20E+00	mg/kg		6.52E+00	NoA
195	1	2,4-Dinitrotoluene	4.50E-01	mg/kg		5.63E-01	NoA
195	1	2,6-Dinitrotoluene	4.50E-01	mg/kg		3.26E+00	NoA
195	1	2-Chloronaphthalene	4.50E-01	mg/kg		6.26E+02	NoA
195	1	2-Chlorophenol	4.50E-01	mg/kg		3.91E+01	NoA
195	1	2-Methyl-4,6-dinitrophenol	2.20E+00	mg/kg		2.61E-01	Yes
195	1	2-Methylnaphthalene	4.50E-01	mg/kg		1.30E+01	NoA
195	1	2-Methylphenol	4.50E-01	mg/kg		1.54E+02	NoA
195	1	2-Nitrobenzenamine	2.20E+00	mg/kg		2.96E-01	Yes
195	1	2-Nitrophenol	4.50E-01	mg/kg			NoC
195	1	3,3'-Dichlorobenzidine	2.20E+00	mg/kg		3.85E-01	Yes
195	1	3-Nitrobenzenamine	2.20E+00	mg/kg		9.78E-01	Yes
195	1	4-Bromophenyl phenyl ether	4.50E-01	mg/kg			NoC
195	1	4-Chloro-3-methylphenol	4.50E-01	mg/kg			NoC
195	1	4-Chlorobenzenamine	4.50E-01	mg/kg		8.66E-01	NoA
195	1	4-Chlorophenyl phenyl ether	4.50E-01	mg/kg			NoC
195	1	4-Nitrophenol	2.20E+00	mg/kg			NoC
195	1	Acenaphthene	4.50E-01	mg/kg		1.17E+02	NoA
195	1	Acenaphthylene	4.50E-01	mg/kg			NoC
195	1	Anthracene	4.50E-01	mg/kg		7.47E+02	NoA
195	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	1	Benzenemethanol	4.50E-01	mg/kg		3.26E+02	NoA
195	1	Benzo(ghi)perylene	4.50E-01	mg/kg			NoC
195	1	Benzoic acid	2.20E+00	mg/kg		1.30E+04	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	1	Bis(2-chloroethoxy)methane	4.50E-01	mg/kg		9.78E+00	NoA
195	1	Bis(2-chloroethyl) ether	9.00E-03	mg/kg		2.14E-01	NoA
195	1	Bis(2-chloroisopropyl) ether	4.50E-01	mg/kg		4.57E+00	NoA
195	1	Bis(2-ethylhexyl)phthalate	4.50E-01	mg/kg		1.25E+01	NoA
195	1	Butyl benzyl phthalate	4.50E-01	mg/kg		9.18E+01	NoA
195	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	1	Dibenzofuran	4.50E-01	mg/kg		3.26E+00	NoA
195	1	Diethyl phthalate	4.50E-01	mg/kg		2.61E+03	NoA
195	1	Dimethyl phthalate	4.50E-01	mg/kg			NoC
195	1	Di-n-butyl phthalate	4.50E-01	mg/kg		3.26E+02	NoA
195	1	Di-n-octylphthalate	4.50E-01	mg/kg		1.30E+02	NoA
195	1	Fluoranthene	4.50E-01	mg/kg		1.09E+02	NoA
195	1	Fluorene	4.50E-01	mg/kg		9.15E+01	NoA
195	1	Hexachlorobenzene	4.50E-01	mg/kg		4.92E-02	Yes
195	1	Hexachlorobutadiene	4.50E-01	mg/kg		2.22E+00	NoA
195	1	Hexachlorocyclopentadiene	2.20E+00	mg/kg		1.95E+01	NoA
195	1	Hexachloroethane	4.50E-01	mg/kg		2.28E+00	NoA
195	1	Isophorone	4.50E-01	mg/kg		1.82E+02	NoA
195	1	m,p-Cresol	9.00E-01	mg/kg		3.91E+01	NoA
195	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	1	Naphthalene	4.50E-01	mg/kg		1.15E+00	NoA
195	1	Nitrobenzene	2.20E+00	mg/kg		4.79E+00	NoA
195	1	N-Nitroso-di-n-propylamine	9.00E-03	mg/kg		1.89E-02	NoA
195	1	N-Nitrosodiphenylamine	4.50E-01	mg/kg		3.22E+01	NoA
195	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	1	Pentachlorophenol	2.20E+00	mg/kg		4.36E-01	Yes
195	1	Phenanthrene	4.50E-01	mg/kg			NoC
195	1	Phenol	4.50E-01	mg/kg		4.98E+02	NoA
195	1	p-Nitroaniline	2.20E+00	mg/kg		8.66E+00	NoA
195	1	Pyrene	4.50E-01	mg/kg		8.12E+01	NoA
195	1	Pyridine	9.00E-01	mg/kg		7.82E+00	NoA
195	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	2	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
195	2	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
195	2	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
195	2	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
195	2	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
195	2	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
195	2	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
195	2	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
195	2	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
195	2	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
195	2	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
195	2	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
195	2	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
195	2	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
195	2	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	2	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
195	2	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
195	2	2-Nitrophenol	4.10E-01	mg/kg			NoC
195	2	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
195	2	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
195	2	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
195	2	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
195	2	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
195	2	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
195	2	4-Nitrophenol	2.00E+00	mg/kg			NoC
195	2	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
195	2	Acenaphthylene	4.10E-01	mg/kg			NoC
195	2	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
195	2	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	2	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
195	2	Benzo(ghi)perylene	4.10E-01	mg/kg			NoC
195	2	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
195	2	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
195	2	Bis(2-chloroethyl) ether	8.30E-03	mg/kg		2.14E-01	NoA
195	2	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
195	2	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
195	2	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
195	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	2	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
195	2	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
195	2	Dimethyl phthalate	4.10E-01	mg/kg			NoC
195	2	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
195	2	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
195	2	Fluoranthene	4.10E-01	mg/kg		1.09E+02	NoA
195	2	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
195	2	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
195	2	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
195	2	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
195	2	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
195	2	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
195	2	m,p-Cresol	8.30E-01	mg/kg		3.91E+01	NoA
195	2	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	2	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
195	2	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
195	2	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
195	2	N-Nitroso-di-n-propylamine	8.30E-03	mg/kg		1.89E-02	NoA
195	2	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
195	2	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	2	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
195	2	Phenanthrene	4.10E-01	mg/kg			NoC
195	2	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
195	2	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
195	2	Pyrene	4.10E-01	mg/kg		8.12E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	2	Pyridine	8.30E-01	mg/kg		7.82E+00	NoA
195	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	2	Thallium	2.50E-01	mg/kg	2.10E-01	3.68E-01	NoA
195	2	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	2	Zinc	2.50E+01	mg/kg	6.50E+01	1.38E+03	NoAB
195	3	1,2,4-Trichlorobenzene	4.30E-01	mg/kg		7.86E-01	NoA
195	3	1,2-Dichlorobenzene	4.30E-01	mg/kg		2.92E+01	NoA
195	3	1,3-Dichlorobenzene	4.30E-01	mg/kg			NoC
195	3	1,4-Dichlorobenzene	4.30E-01	mg/kg		8.13E-01	NoA
195	3	2,4,5-Trichlorophenol	4.30E-01	mg/kg		3.26E+02	NoA
195	3	2,4,6-Trichlorophenol	4.30E-01	mg/kg		3.26E+00	NoA
195	3	2,4-Dichlorophenol	4.30E-01	mg/kg		9.78E+00	NoA
195	3	2,4-Dimethylphenol	4.30E-01	mg/kg		6.52E+01	NoA
195	3	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
195	3	2,4-Dinitrotoluene	4.30E-01	mg/kg		5.63E-01	NoA
195	3	2,6-Dinitrotoluene	4.30E-01	mg/kg		3.26E+00	NoA
195	3	2-Chloronaphthalene	4.30E-01	mg/kg		6.26E+02	NoA
195	3	2-Chlorophenol	4.30E-01	mg/kg		3.91E+01	NoA
195	3	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
195	3	2-Methylnaphthalene	4.30E-01	mg/kg		1.30E+01	NoA
195	3	2-Methylphenol	4.30E-01	mg/kg		1.54E+02	NoA
195	3	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
195	3	2-Nitrophenol	4.30E-01	mg/kg			NoC
195	3	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
195	3	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
195	3	4-Bromophenyl phenyl ether	4.30E-01	mg/kg			NoC
195	3	4-Chloro-3-methylphenol	4.30E-01	mg/kg			NoC
195	3	4-Chlorobenzenamine	4.30E-01	mg/kg		8.66E-01	NoA
195	3	4-Chlorophenyl phenyl ether	4.30E-01	mg/kg			NoC
195	3	4-Nitrophenol	2.10E+00	mg/kg			NoC
195	3	Acenaphthene	4.30E-01	mg/kg		1.17E+02	NoA
195	3	Acenaphthylene	4.30E-01	mg/kg			NoC
195	3	Anthracene	4.30E-01	mg/kg		7.47E+02	NoA
195	3	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	3	Benzenemethanol	4.30E-01	mg/kg		3.26E+02	NoA
195	3	Benzo(ghi)perylene	4.30E-01	mg/kg			NoC
195	3	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
195	3	Bis(2-chloroethoxy)methane	4.30E-01	mg/kg		9.78E+00	NoA
195	3	Bis(2-chloroethyl) ether	8.60E-03	mg/kg		2.14E-01	NoA
195	3	Bis(2-chloroisopropyl) ether	4.30E-01	mg/kg		4.57E+00	NoA
195	3	Bis(2-ethylhexyl)phthalate	4.30E-01	mg/kg		1.25E+01	NoA
195	3	Butyl benzyl phthalate	4.30E-01	mg/kg		9.18E+01	NoA
195	3	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	3	Dibenzofuran	4.30E-01	mg/kg		3.26E+00	NoA
195	3	Diethyl phthalate	4.30E-01	mg/kg		2.61E+03	NoA
195	3	Dimethyl phthalate	4.30E-01	mg/kg			NoC
195	3	Di-n-butyl phthalate	4.30E-01	mg/kg		3.26E+02	NoA
195	3	Di-n-octylphthalate	4.30E-01	mg/kg		1.30E+02	NoA
195	3	Fluorene	4.30E-01	mg/kg		9.15E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	3	Hexachlorobenzene	4.30E-01	mg/kg		4.92E-02	Yes
195	3	Hexachlorobutadiene	4.30E-01	mg/kg		2.22E+00	NoA
195	3	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
195	3	Hexachloroethane	4.30E-01	mg/kg		2.28E+00	NoA
195	3	Isophorone	4.30E-01	mg/kg		1.82E+02	NoA
195	3	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	3	m,p-Cresol	8.60E-01	mg/kg		3.91E+01	NoA
195	3	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	3	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	3	Naphthalene	4.30E-01	mg/kg		1.15E+00	NoA
195	3	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
195	3	N-Nitroso-di-n-propylamine	8.60E-03	mg/kg		1.89E-02	NoA
195	3	N-Nitrosodiphenylamine	4.30E-01	mg/kg		3.22E+01	NoA
195	3	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	3	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
195	3	Phenanthrene	4.30E-01	mg/kg			NoC
195	3	Phenol	4.30E-01	mg/kg		4.98E+02	NoA
195	3	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
195	3	Pyridine	8.60E-01	mg/kg		7.82E+00	NoA
195	3	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	3	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	3	Thallium	2.60E-01	mg/kg	2.10E-01	3.68E-01	NoA
195	3	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	4	1,2,4-Trichlorobenzene	4.50E-01	mg/kg		7.86E-01	NoA
195	4	1,2-Dichlorobenzene	4.50E-01	mg/kg		2.92E+01	NoA
195	4	1,3-Dichlorobenzene	4.50E-01	mg/kg			NoC
195	4	1,4-Dichlorobenzene	4.50E-01	mg/kg		8.13E-01	NoA
195	4	2,4,5-Trichlorophenol	4.50E-01	mg/kg		3.26E+02	NoA
195	4	2,4,6-Trichlorophenol	4.50E-01	mg/kg		3.26E+00	NoA
195	4	2,4-Dichlorophenol	4.50E-01	mg/kg		9.78E+00	NoA
195	4	2,4-Dimethylphenol	4.50E-01	mg/kg		6.52E+01	NoA
195	4	2,4-Dinitrophenol	2.20E+00	mg/kg		6.52E+00	NoA
195	4	2,4-Dinitrotoluene	4.50E-01	mg/kg		5.63E-01	NoA
195	4	2,6-Dinitrotoluene	4.50E-01	mg/kg		3.26E+00	NoA
195	4	2-Chloronaphthalene	4.50E-01	mg/kg		6.26E+02	NoA
195	4	2-Chlorophenol	4.50E-01	mg/kg		3.91E+01	NoA
195	4	2-Methyl-4,6-dinitrophenol	2.20E+00	mg/kg		2.61E-01	Yes
195	4	2-Methylnaphthalene	4.50E-01	mg/kg		1.30E+01	NoA
195	4	2-Methylphenol	4.50E-01	mg/kg		1.54E+02	NoA
195	4	2-Nitrobenzenamine	2.20E+00	mg/kg		2.96E-01	Yes
195	4	2-Nitrophenol	4.50E-01	mg/kg			NoC
195	4	3,3'-Dichlorobenzidine	2.20E+00	mg/kg		3.85E-01	Yes
195	4	3-Nitrobenzenamine	2.20E+00	mg/kg		9.78E-01	Yes
195	4	4-Bromophenyl phenyl ether	4.50E-01	mg/kg			NoC
195	4	4-Chloro-3-methylphenol	4.50E-01	mg/kg			NoC
195	4	4-Chlorobenzenamine	4.50E-01	mg/kg		8.66E-01	NoA
195	4	4-Chlorophenyl phenyl ether	4.50E-01	mg/kg			NoC
195	4	4-Nitrophenol	2.20E+00	mg/kg			NoC
195	4	Acenaphthene	4.50E-01	mg/kg		1.17E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	4	Acenaphthylene	4.50E-01	mg/kg			NoC
195	4	Anthracene	4.50E-01	mg/kg		7.47E+02	NoA
195	4	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	4	Benzenemethanol	4.50E-01	mg/kg		3.26E+02	NoA
195	4	Benzo(ghi)perylene	4.50E-01	mg/kg			NoC
195	4	Benzoic acid	2.20E+00	mg/kg		1.30E+04	NoA
195	4	Bis(2-chloroethoxy)methane	4.50E-01	mg/kg		9.78E+00	NoA
195	4	Bis(2-chloroethyl) ether	8.90E-03	mg/kg		2.14E-01	NoA
195	4	Bis(2-chloroisopropyl) ether	4.50E-01	mg/kg		4.57E+00	NoA
195	4	Bis(2-ethylhexyl)phthalate	4.50E-01	mg/kg		1.25E+01	NoA
195	4	Butyl benzyl phthalate	4.50E-01	mg/kg		9.18E+01	NoA
195	4	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	4	Dibenzofuran	4.50E-01	mg/kg		3.26E+00	NoA
195	4	Diethyl phthalate	4.50E-01	mg/kg		2.61E+03	NoA
195	4	Dimethyl phthalate	4.50E-01	mg/kg			NoC
195	4	Di-n-butyl phthalate	4.50E-01	mg/kg		3.26E+02	NoA
195	4	Di-n-octylphthalate	4.50E-01	mg/kg		1.30E+02	NoA
195	4	Fluoranthene	4.50E-01	mg/kg		1.09E+02	NoA
195	4	Fluorene	4.50E-01	mg/kg		9.15E+01	NoA
195	4	Hexachlorobenzene	4.50E-01	mg/kg		4.92E-02	Yes
195	4	Hexachlorobutadiene	4.50E-01	mg/kg		2.22E+00	NoA
195	4	Hexachlorocyclopentadiene	2.20E+00	mg/kg		1.95E+01	NoA
195	4	Hexachloroethane	4.50E-01	mg/kg		2.28E+00	NoA
195	4	Isophorone	4.50E-01	mg/kg		1.82E+02	NoA
195	4	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	4	m,p-Cresol	8.90E-01	mg/kg		3.91E+01	NoA
195	4	Manganese	8.50E+01	mg/kg	1.50E+03	4.19E+02	NoAB
195	4	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	4	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	4	Naphthalene	4.50E-01	mg/kg		1.15E+00	NoA
195	4	Nitrobenzene	2.20E+00	mg/kg		4.79E+00	NoA
195	4	N-Nitroso-di-n-propylamine	8.90E-03	mg/kg		1.89E-02	NoA
195	4	N-Nitrosodiphenylamine	4.50E-01	mg/kg		3.22E+01	NoA
195	4	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	4	Pentachlorophenol	2.20E+00	mg/kg		4.36E-01	Yes
195	4	Phenanthrene	4.50E-01	mg/kg			NoC
195	4	Phenol	4.50E-01	mg/kg		4.98E+02	NoA
195	4	p-Nitroaniline	2.20E+00	mg/kg		8.66E+00	NoA
195	4	Pyrene	4.50E-01	mg/kg		8.12E+01	NoA
195	4	Pyridine	8.90E-01	mg/kg		7.82E+00	NoA
195	4	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	4	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	4	Thallium	2.70E-01	mg/kg	2.10E-01	3.68E-01	NoA
195	4	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	5	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
195	5	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
195	5	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
195	5	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
195	5	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	5	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
195	5	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
195	5	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
195	5	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
195	5	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
195	5	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
195	5	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
195	5	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
195	5	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
195	5	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
195	5	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
195	5	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
195	5	2-Nitrophenol	4.20E-01	mg/kg			NoC
195	5	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
195	5	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
195	5	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	5	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
195	5	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
195	5	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	5	4-Nitrophenol	2.00E+00	mg/kg			NoC
195	5	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
195	5	Acenaphthylene	4.20E-01	mg/kg			NoC
195	5	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
195	5	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	5	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
195	5	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
195	5	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
195	5	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
195	5	Bis(2-chloroethyl) ether	8.30E-03	mg/kg		2.14E-01	NoA
195	5	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
195	5	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
195	5	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
195	5	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	5	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
195	5	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
195	5	Dimethyl phthalate	4.20E-01	mg/kg			NoC
195	5	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
195	5	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
195	5	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
195	5	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
195	5	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
195	5	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
195	5	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
195	5	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
195	5	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	5	m,p-Cresol	8.30E-01	mg/kg		3.91E+01	NoA
195	5	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	5	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	5	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	5	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
195	5	N-Nitroso-di-n-propylamine	8.30E-03	mg/kg		1.89E-02	NoA
195	5	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
195	5	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	5	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
195	5	Phenanthrene	4.00E-01	mg/kg			NoC
195	5	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
195	5	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
195	5	Pyridine	8.30E-01	mg/kg		7.82E+00	NoA
195	5	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	5	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	5	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	6	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
195	6	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
195	6	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
195	6	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
195	6	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
195	6	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
195	6	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
195	6	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
195	6	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
195	6	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
195	6	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
195	6	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
195	6	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
195	6	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
195	6	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
195	6	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
195	6	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
195	6	2-Nitrophenol	4.20E-01	mg/kg			NoC
195	6	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
195	6	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
195	6	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	6	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
195	6	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
195	6	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	6	4-Nitrophenol	2.00E+00	mg/kg			NoC
195	6	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
195	6	Acenaphthylene	4.20E-01	mg/kg			NoC
195	6	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	6	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
195	6	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
195	6	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
195	6	Bis(2-chloroethyl) ether	8.40E-03	mg/kg		2.14E-01	NoA
195	6	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
195	6	Bis(2-ethylhexyl)phthalate	4.20E-01	mg/kg		1.25E+01	NoA
195	6	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
195	6	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	6	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	6	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
195	6	Dimethyl phthalate	4.20E-01	mg/kg			NoC
195	6	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
195	6	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
195	6	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
195	6	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
195	6	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
195	6	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
195	6	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
195	6	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
195	6	m,p-Cresol	8.40E-01	mg/kg		3.91E+01	NoA
195	6	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	6	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	6	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
195	6	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
195	6	N-Nitroso-di-n-propylamine	8.40E-03	mg/kg		1.89E-02	NoA
195	6	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
195	6	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	6	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
195	6	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
195	6	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
195	6	Pyridine	8.40E-01	mg/kg		7.82E+00	NoA
195	6	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	6	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	6	Thallium	2.50E-01	mg/kg	2.10E-01	3.68E-01	NoA
195	6	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	7	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
195	7	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
195	7	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
195	7	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
195	7	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
195	7	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
195	7	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
195	7	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
195	7	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
195	7	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
195	7	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
195	7	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
195	7	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
195	7	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
195	7	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
195	7	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
195	7	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
195	7	2-Nitrophenol	4.20E-01	mg/kg			NoC
195	7	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
195	7	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
195	7	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	7	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
195	7	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	7	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	7	4-Nitrophenol	2.00E+00	mg/kg			NoC
195	7	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
195	7	Acenaphthylene	4.20E-01	mg/kg			NoC
195	7	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
195	7	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	7	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
195	7	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
195	7	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
195	7	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
195	7	Bis(2-chloroethyl) ether	8.40E-03	mg/kg		2.14E-01	NoA
195	7	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
195	7	Bis(2-ethylhexyl)phthalate	4.20E-01	mg/kg		1.25E+01	NoA
195	7	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
195	7	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	7	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
195	7	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
195	7	Dimethyl phthalate	4.20E-01	mg/kg			NoC
195	7	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
195	7	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
195	7	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
195	7	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
195	7	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
195	7	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
195	7	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
195	7	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
195	7	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
195	7	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	7	m,p-Cresol	8.40E-01	mg/kg		3.91E+01	NoA
195	7	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	7	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	7	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
195	7	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
195	7	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
195	7	N-Nitroso-di-n-propylamine	8.40E-03	mg/kg		1.89E-02	NoA
195	7	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
195	7	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	7	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
195	7	Phenanthrene	4.20E-01	mg/kg			NoC
195	7	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
195	7	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
195	7	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
195	7	Pyridine	8.40E-01	mg/kg		7.82E+00	NoA
195	7	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	7	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	8	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
195	8	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
195	8	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
195	8	1,4-Dichlorobenzene	4.40E-01	mg/kg		8.13E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	8	2,4,5-Trichlorophenol	4.40E-01	mg/kg		3.26E+02	NoA
195	8	2,4,6-Trichlorophenol	4.40E-01	mg/kg		3.26E+00	NoA
195	8	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
195	8	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
195	8	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
195	8	2,4-Dinitrotoluene	4.40E-01	mg/kg		5.63E-01	NoA
195	8	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
195	8	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA
195	8	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
195	8	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
195	8	2-Methylnaphthalene	4.40E-01	mg/kg		1.30E+01	NoA
195	8	2-Methylphenol	4.40E-01	mg/kg		1.54E+02	NoA
195	8	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
195	8	2-Nitrophenol	4.40E-01	mg/kg			NoC
195	8	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
195	8	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
195	8	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
195	8	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
195	8	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
195	8	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
195	8	4-Nitrophenol	2.10E+00	mg/kg			NoC
195	8	Acenaphthene	4.40E-01	mg/kg		1.17E+02	NoA
195	8	Acenaphthylene	4.40E-01	mg/kg			NoC
195	8	Anthracene	4.40E-01	mg/kg		7.47E+02	NoA
195	8	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
195	8	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
195	8	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
195	8	Bis(2-chloroethyl) ether	8.80E-03	mg/kg		2.14E-01	NoA
195	8	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA
195	8	Bis(2-ethylhexyl)phthalate	4.40E-01	mg/kg		1.25E+01	NoA
195	8	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
195	8	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	8	Dibenzofuran	4.40E-01	mg/kg		3.26E+00	NoA
195	8	Diethyl phthalate	4.40E-01	mg/kg		2.61E+03	NoA
195	8	Dimethyl phthalate	4.40E-01	mg/kg			NoC
195	8	Di-n-butyl phthalate	4.40E-01	mg/kg		3.26E+02	NoA
195	8	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA
195	8	Fluorene	4.40E-01	mg/kg		9.15E+01	NoA
195	8	Hexachlorobenzene	4.40E-01	mg/kg		4.92E-02	Yes
195	8	Hexachlorobutadiene	4.40E-01	mg/kg		2.22E+00	NoA
195	8	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
195	8	Hexachloroethane	4.40E-01	mg/kg		2.28E+00	NoA
195	8	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
195	8	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	8	m,p-Cresol	8.80E-01	mg/kg		3.91E+01	NoA
195	8	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	8	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	8	Naphthalene	4.40E-01	mg/kg		1.15E+00	NoA
195	8	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	8	N-Nitroso-di-n-propylamine	8.80E-03	mg/kg		1.89E-02	NoA
195	8	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
195	8	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	8	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
195	8	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
195	8	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
195	8	Pyridine	8.80E-01	mg/kg		7.82E+00	NoA
195	8	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	8	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	8	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	9	1,2,4-Trichlorobenzene	4.60E-01	mg/kg		7.86E-01	NoA
195	9	1,2-Dichlorobenzene	4.60E-01	mg/kg		2.92E+01	NoA
195	9	1,3-Dichlorobenzene	4.60E-01	mg/kg			NoC
195	9	1,4-Dichlorobenzene	4.60E-01	mg/kg		8.13E-01	NoA
195	9	2,4,5-Trichlorophenol	4.60E-01	mg/kg		3.26E+02	NoA
195	9	2,4,6-Trichlorophenol	4.60E-01	mg/kg		3.26E+00	NoA
195	9	2,4-Dichlorophenol	4.60E-01	mg/kg		9.78E+00	NoA
195	9	2,4-Dimethylphenol	4.60E-01	mg/kg		6.52E+01	NoA
195	9	2,4-Dinitrophenol	2.20E+00	mg/kg		6.52E+00	NoA
195	9	2,4-Dinitrotoluene	4.60E-01	mg/kg		5.63E-01	NoA
195	9	2,6-Dinitrotoluene	4.60E-01	mg/kg		3.26E+00	NoA
195	9	2-Chloronaphthalene	4.60E-01	mg/kg		6.26E+02	NoA
195	9	2-Chlorophenol	4.60E-01	mg/kg		3.91E+01	NoA
195	9	2-Methyl-4,6-dinitrophenol	2.20E+00	mg/kg		2.61E-01	Yes
195	9	2-Methylnaphthalene	4.60E-01	mg/kg		1.30E+01	NoA
195	9	2-Methylphenol	4.60E-01	mg/kg		1.54E+02	NoA
195	9	2-Nitrobenzenamine	2.20E+00	mg/kg		2.96E-01	Yes
195	9	2-Nitrophenol	4.60E-01	mg/kg			NoC
195	9	3,3'-Dichlorobenzidine	2.20E+00	mg/kg		3.85E-01	Yes
195	9	3-Nitrobenzenamine	2.20E+00	mg/kg		9.78E-01	Yes
195	9	4-Bromophenyl phenyl ether	4.60E-01	mg/kg			NoC
195	9	4-Chloro-3-methylphenol	4.60E-01	mg/kg			NoC
195	9	4-Chlorobenzenamine	4.60E-01	mg/kg		8.66E-01	NoA
195	9	4-Chlorophenyl phenyl ether	4.60E-01	mg/kg			NoC
195	9	4-Nitrophenol	2.20E+00	mg/kg			NoC
195	9	Acenaphthene	4.60E-01	mg/kg		1.17E+02	NoA
195	9	Acenaphthylene	4.60E-01	mg/kg			NoC
195	9	Anthracene	4.60E-01	mg/kg		7.47E+02	NoA
195	9	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	9	Benzenemethanol	4.60E-01	mg/kg		3.26E+02	NoA
195	9	Benzo(ghi)perylene	4.60E-01	mg/kg			NoC
195	9	Benzoic acid	2.20E+00	mg/kg		1.30E+04	NoA
195	9	Bis(2-chloroethoxy)methane	4.60E-01	mg/kg		9.78E+00	NoA
195	9	Bis(2-chloroethyl) ether	9.20E-03	mg/kg		2.14E-01	NoA
195	9	Bis(2-chloroisopropyl) ether	4.60E-01	mg/kg		4.57E+00	NoA
195	9	Butyl benzyl phthalate	4.60E-01	mg/kg		9.18E+01	NoA
195	9	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	9	Dibenzofuran	4.60E-01	mg/kg		3.26E+00	NoA
195	9	Diethyl phthalate	4.60E-01	mg/kg		2.61E+03	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	9	Dimethyl phthalate	4.60E-01	mg/kg			NoC
195	9	Di-n-butyl phthalate	4.60E-01	mg/kg		3.26E+02	NoA
195	9	Di-n-octylphthalate	4.60E-01	mg/kg		1.30E+02	NoA
195	9	Fluoranthene	4.60E-01	mg/kg		1.09E+02	NoA
195	9	Fluorene	4.60E-01	mg/kg		9.15E+01	NoA
195	9	Hexachlorobenzene	4.60E-01	mg/kg		4.92E-02	Yes
195	9	Hexachlorobutadiene	4.60E-01	mg/kg		2.22E+00	NoA
195	9	Hexachlorocyclopentadiene	2.20E+00	mg/kg		1.95E+01	NoA
195	9	Hexachloroethane	4.60E-01	mg/kg		2.28E+00	NoA
195	9	Isophorone	4.60E-01	mg/kg		1.82E+02	NoA
195	9	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	9	m,p-Cresol	9.20E-01	mg/kg		3.91E+01	NoA
195	9	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	9	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	9	Naphthalene	4.60E-01	mg/kg		1.15E+00	NoA
195	9	Nitrobenzene	2.20E+00	mg/kg		4.79E+00	NoA
195	9	N-Nitroso-di-n-propylamine	9.20E-03	mg/kg		1.89E-02	NoA
195	9	N-Nitrosodiphenylamine	4.60E-01	mg/kg		3.22E+01	NoA
195	9	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	9	Pentachlorophenol	2.20E+00	mg/kg		4.36E-01	Yes
195	9	Phenanthrene	4.60E-01	mg/kg			NoC
195	9	Phenol	4.60E-01	mg/kg		4.98E+02	NoA
195	9	p-Nitroaniline	2.20E+00	mg/kg		8.66E+00	NoA
195	9	Pyrene	4.60E-01	mg/kg		8.12E+01	NoA
195	9	Pyridine	9.20E-01	mg/kg		7.82E+00	NoA
195	9	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	9	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	9	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	10	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
195	10	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
195	10	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
195	10	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
195	10	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
195	10	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
195	10	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
195	10	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
195	10	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
195	10	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
195	10	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
195	10	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
195	10	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
195	10	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
195	10	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
195	10	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
195	10	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
195	10	2-Nitrophenol	4.20E-01	mg/kg			NoC
195	10	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
195	10	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
195	10	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	10	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
195	10	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
195	10	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	10	4-Nitrophenol	2.10E+00	mg/kg			NoC
195	10	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
195	10	Acenaphthylene	4.20E-01	mg/kg			NoC
195	10	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
195	10	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	10	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
195	10	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
195	10	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
195	10	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
195	10	Bis(2-chloroethyl) ether	8.50E-03	mg/kg		2.14E-01	NoA
195	10	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
195	10	Bis(2-ethylhexyl)phthalate	4.20E-01	mg/kg		1.25E+01	NoA
195	10	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
195	10	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	10	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
195	10	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
195	10	Dimethyl phthalate	4.20E-01	mg/kg			NoC
195	10	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
195	10	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
195	10	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
195	10	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
195	10	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
195	10	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
195	10	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
195	10	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
195	10	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
195	10	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	10	m,p-Cresol	8.50E-01	mg/kg		3.91E+01	NoA
195	10	Manganese	8.50E+01	mg/kg	1.50E+03	4.19E+02	NoAB
195	10	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	10	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	10	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
195	10	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
195	10	N-Nitroso-di-n-propylamine	8.50E-03	mg/kg		1.89E-02	NoA
195	10	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
195	10	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	10	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
195	10	Phenanthrene	4.20E-01	mg/kg			NoC
195	10	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
195	10	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
195	10	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
195	10	Pyridine	8.50E-01	mg/kg		7.82E+00	NoA
195	10	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	10	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	11	1,2,4-Trichlorobenzene	4.30E-01	mg/kg		7.86E-01	NoA
195	11	1,2-Dichlorobenzene	4.30E-01	mg/kg		2.92E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	11	1,3-Dichlorobenzene	4.30E-01	mg/kg			NoC
195	11	1,4-Dichlorobenzene	4.30E-01	mg/kg		8.13E-01	NoA
195	11	2,4,5-Trichlorophenol	4.30E-01	mg/kg		3.26E+02	NoA
195	11	2,4,6-Trichlorophenol	4.30E-01	mg/kg		3.26E+00	NoA
195	11	2,4-Dichlorophenol	4.30E-01	mg/kg		9.78E+00	NoA
195	11	2,4-Dimethylphenol	4.30E-01	mg/kg		6.52E+01	NoA
195	11	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
195	11	2,4-Dinitrotoluene	4.30E-01	mg/kg		5.63E-01	NoA
195	11	2,6-Dinitrotoluene	4.30E-01	mg/kg		3.26E+00	NoA
195	11	2-Chloronaphthalene	4.30E-01	mg/kg		6.26E+02	NoA
195	11	2-Chlorophenol	4.30E-01	mg/kg		3.91E+01	NoA
195	11	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
195	11	2-Methylnaphthalene	4.30E-01	mg/kg		1.30E+01	NoA
195	11	2-Methylphenol	4.30E-01	mg/kg		1.54E+02	NoA
195	11	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
195	11	2-Nitrophenol	4.30E-01	mg/kg			NoC
195	11	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
195	11	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
195	11	4-Bromophenyl phenyl ether	4.30E-01	mg/kg			NoC
195	11	4-Chloro-3-methylphenol	4.30E-01	mg/kg			NoC
195	11	4-Chlorobenzenamine	4.30E-01	mg/kg		8.66E-01	NoA
195	11	4-Chlorophenyl phenyl ether	4.30E-01	mg/kg			NoC
195	11	4-Nitrophenol	2.10E+00	mg/kg			NoC
195	11	Acenaphthene	4.30E-01	mg/kg		1.17E+02	NoA
195	11	Acenaphthylene	4.30E-01	mg/kg			NoC
195	11	Anthracene	4.30E-01	mg/kg		7.47E+02	NoA
195	11	Benzenemethanol	4.30E-01	mg/kg		3.26E+02	NoA
195	11	Benzo(ghi)perylene	4.30E-01	mg/kg			NoC
195	11	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
195	11	Bis(2-chloroethoxy)methane	4.30E-01	mg/kg		9.78E+00	NoA
195	11	Bis(2-chloroethyl) ether	8.50E-03	mg/kg		2.14E-01	NoA
195	11	Bis(2-chloroisopropyl) ether	4.30E-01	mg/kg		4.57E+00	NoA
195	11	Bis(2-ethylhexyl)phthalate	4.30E-01	mg/kg		1.25E+01	NoA
195	11	Butyl benzyl phthalate	4.30E-01	mg/kg		9.18E+01	NoA
195	11	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	11	Dibenzofuran	4.30E-01	mg/kg		3.26E+00	NoA
195	11	Diethyl phthalate	4.30E-01	mg/kg		2.61E+03	NoA
195	11	Dimethyl phthalate	4.30E-01	mg/kg			NoC
195	11	Di-n-butyl phthalate	4.30E-01	mg/kg		3.26E+02	NoA
195	11	Di-n-octylphthalate	4.30E-01	mg/kg		1.30E+02	NoA
195	11	Fluoranthene	4.30E-01	mg/kg		1.09E+02	NoA
195	11	Fluorene	4.30E-01	mg/kg		9.15E+01	NoA
195	11	Hexachlorobenzene	4.30E-01	mg/kg		4.92E-02	Yes
195	11	Hexachlorobutadiene	4.30E-01	mg/kg		2.22E+00	NoA
195	11	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
195	11	Hexachloroethane	4.30E-01	mg/kg		2.28E+00	NoA
195	11	Isophorone	4.30E-01	mg/kg		1.82E+02	NoA
195	11	m,p-Cresol	8.50E-01	mg/kg		3.91E+01	NoA
195	11	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	11	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	11	Naphthalene	4.30E-01	mg/kg		1.15E+00	NoA
195	11	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
195	11	N-Nitroso-di-n-propylamine	8.50E-03	mg/kg		1.89E-02	NoA
195	11	N-Nitrosodiphenylamine	4.30E-01	mg/kg		3.22E+01	NoA
195	11	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	11	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
195	11	Phenanthrene	4.30E-01	mg/kg			NoC
195	11	Phenol	4.30E-01	mg/kg		4.98E+02	NoA
195	11	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
195	11	Pyrene	4.30E-01	mg/kg		8.12E+01	NoA
195	11	Pyridine	8.50E-01	mg/kg		7.82E+00	NoA
195	11	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	11	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	11	Total PAH	8.50E-03	mg/kg		1.97E-02	NoA
195	11	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	12	1,2,4-Trichlorobenzene	4.30E-01	mg/kg		7.86E-01	NoA
195	12	1,2-Dichlorobenzene	4.30E-01	mg/kg		2.92E+01	NoA
195	12	1,3-Dichlorobenzene	4.30E-01	mg/kg			NoC
195	12	1,4-Dichlorobenzene	4.30E-01	mg/kg		8.13E-01	NoA
195	12	2,4,5-Trichlorophenol	4.30E-01	mg/kg		3.26E+02	NoA
195	12	2,4,6-Trichlorophenol	4.30E-01	mg/kg		3.26E+00	NoA
195	12	2,4-Dichlorophenol	4.30E-01	mg/kg		9.78E+00	NoA
195	12	2,4-Dimethylphenol	4.30E-01	mg/kg		6.52E+01	NoA
195	12	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
195	12	2,4-Dinitrotoluene	4.30E-01	mg/kg		5.63E-01	NoA
195	12	2,6-Dinitrotoluene	4.30E-01	mg/kg		3.26E+00	NoA
195	12	2-Chloronaphthalene	4.30E-01	mg/kg		6.26E+02	NoA
195	12	2-Chlorophenol	4.30E-01	mg/kg		3.91E+01	NoA
195	12	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
195	12	2-Methylnaphthalene	4.30E-01	mg/kg		1.30E+01	NoA
195	12	2-Methylphenol	4.30E-01	mg/kg		1.54E+02	NoA
195	12	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
195	12	2-Nitrophenol	4.30E-01	mg/kg			NoC
195	12	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
195	12	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
195	12	4-Bromophenyl phenyl ether	4.30E-01	mg/kg			NoC
195	12	4-Chloro-3-methylphenol	4.30E-01	mg/kg			NoC
195	12	4-Chlorobenzenamine	4.30E-01	mg/kg		8.66E-01	NoA
195	12	4-Chlorophenyl phenyl ether	4.30E-01	mg/kg			NoC
195	12	4-Nitrophenol	2.10E+00	mg/kg			NoC
195	12	Acenaphthene	4.30E-01	mg/kg		1.17E+02	NoA
195	12	Acenaphthylene	4.30E-01	mg/kg			NoC
195	12	Anthracene	4.30E-01	mg/kg		7.47E+02	NoA
195	12	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	12	Benzenemethanol	4.30E-01	mg/kg		3.26E+02	NoA
195	12	Benzo(ghi)perylene	4.30E-01	mg/kg			NoC
195	12	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
195	12	Bis(2-chloroethoxy)methane	4.30E-01	mg/kg		9.78E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	12	Bis(2-chloroethyl) ether	8.50E-03	mg/kg		2.14E-01	NoA
195	12	Bis(2-chloroisopropyl) ether	4.30E-01	mg/kg		4.57E+00	NoA
195	12	Bis(2-ethylhexyl)phthalate	4.30E-01	mg/kg		1.25E+01	NoA
195	12	Butyl benzyl phthalate	4.30E-01	mg/kg		9.18E+01	NoA
195	12	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	12	Dibenzofuran	4.30E-01	mg/kg		3.26E+00	NoA
195	12	Diethyl phthalate	4.30E-01	mg/kg		2.61E+03	NoA
195	12	Dimethyl phthalate	4.30E-01	mg/kg			NoC
195	12	Di-n-butyl phthalate	4.30E-01	mg/kg		3.26E+02	NoA
195	12	Di-n-octylphthalate	4.30E-01	mg/kg		1.30E+02	NoA
195	12	Fluoranthene	4.30E-01	mg/kg		1.09E+02	NoA
195	12	Fluorene	4.30E-01	mg/kg		9.15E+01	NoA
195	12	Hexachlorobenzene	4.30E-01	mg/kg		4.92E-02	Yes
195	12	Hexachlorobutadiene	4.30E-01	mg/kg		2.22E+00	NoA
195	12	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
195	12	Hexachloroethane	4.30E-01	mg/kg		2.28E+00	NoA
195	12	Isophorone	4.30E-01	mg/kg		1.82E+02	NoA
195	12	m,p-Cresol	8.50E-01	mg/kg		3.91E+01	NoA
195	12	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	12	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	12	Naphthalene	4.30E-01	mg/kg		1.15E+00	NoA
195	12	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
195	12	N-Nitroso-di-n-propylamine	8.50E-03	mg/kg		1.89E-02	NoA
195	12	N-Nitrosodiphenylamine	4.30E-01	mg/kg		3.22E+01	NoA
195	12	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	12	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
195	12	Phenanthrene	4.30E-01	mg/kg			NoC
195	12	Phenol	4.30E-01	mg/kg		4.98E+02	NoA
195	12	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
195	12	Pyrene	4.30E-01	mg/kg		8.12E+01	NoA
195	12	Pyridine	8.50E-01	mg/kg		7.82E+00	NoA
195	12	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	12	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	12	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	13	1,2,4-Trichlorobenzene	3.90E-01	mg/kg		7.86E-01	NoA
195	13	1,2-Dichlorobenzene	3.90E-01	mg/kg		2.92E+01	NoA
195	13	1,3-Dichlorobenzene	3.90E-01	mg/kg			NoC
195	13	1,4-Dichlorobenzene	3.90E-01	mg/kg		8.13E-01	NoA
195	13	2,4,5-Trichlorophenol	3.90E-01	mg/kg		3.26E+02	NoA
195	13	2,4,6-Trichlorophenol	3.90E-01	mg/kg		3.26E+00	NoA
195	13	2,4-Dichlorophenol	3.90E-01	mg/kg		9.78E+00	NoA
195	13	2,4-Dimethylphenol	3.90E-01	mg/kg		6.52E+01	NoA
195	13	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
195	13	2,4-Dinitrotoluene	3.90E-01	mg/kg		5.63E-01	NoA
195	13	2,6-Dinitrotoluene	3.90E-01	mg/kg		3.26E+00	NoA
195	13	2-Chloronaphthalene	3.90E-01	mg/kg		6.26E+02	NoA
195	13	2-Chlorophenol	3.90E-01	mg/kg		3.91E+01	NoA
195	13	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
195	13	2-Methylnaphthalene	3.90E-01	mg/kg		1.30E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	13	2-Methylphenol	3.90E-01	mg/kg		1.54E+02	NoA
195	13	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
195	13	2-Nitrophenol	3.90E-01	mg/kg			NoC
195	13	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
195	13	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
195	13	4-Bromophenyl phenyl ether	3.90E-01	mg/kg			NoC
195	13	4-Chloro-3-methylphenol	3.90E-01	mg/kg			NoC
195	13	4-Chlorobenzenamine	3.90E-01	mg/kg		8.66E-01	NoA
195	13	4-Chlorophenyl phenyl ether	3.90E-01	mg/kg			NoC
195	13	4-Nitrophenol	1.90E+00	mg/kg			NoC
195	13	Acenaphthene	3.90E-01	mg/kg		1.17E+02	NoA
195	13	Acenaphthylene	3.90E-01	mg/kg			NoC
195	13	Anthracene	3.90E-01	mg/kg		7.47E+02	NoA
195	13	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	13	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
195	13	Benzo(ghi)perylene	3.90E-01	mg/kg			NoC
195	13	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
195	13	Bis(2-chloroethoxy)methane	3.90E-01	mg/kg		9.78E+00	NoA
195	13	Bis(2-chloroethyl) ether	7.90E-03	mg/kg		2.14E-01	NoA
195	13	Bis(2-chloroisopropyl) ether	3.90E-01	mg/kg		4.57E+00	NoA
195	13	Butyl benzyl phthalate	3.90E-01	mg/kg		9.18E+01	NoA
195	13	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	13	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
195	13	Diethyl phthalate	3.90E-01	mg/kg		2.61E+03	NoA
195	13	Dimethyl phthalate	3.90E-01	mg/kg			NoC
195	13	Di-n-butyl phthalate	3.90E-01	mg/kg		3.26E+02	NoA
195	13	Di-n-octylphthalate	3.90E-01	mg/kg		1.30E+02	NoA
195	13	Fluoranthene	3.90E-01	mg/kg		1.09E+02	NoA
195	13	Fluorene	3.90E-01	mg/kg		9.15E+01	NoA
195	13	Hexachlorobenzene	3.90E-01	mg/kg		4.92E-02	Yes
195	13	Hexachlorobutadiene	3.90E-01	mg/kg		2.22E+00	NoA
195	13	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
195	13	Hexachloroethane	3.90E-01	mg/kg		2.28E+00	NoA
195	13	Isophorone	3.90E-01	mg/kg		1.82E+02	NoA
195	13	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	13	m,p-Cresol	7.90E-01	mg/kg		3.91E+01	NoA
195	13	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	13	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	13	Naphthalene	3.90E-01	mg/kg		1.15E+00	NoA
195	13	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
195	13	N-Nitroso-di-n-propylamine	7.90E-03	mg/kg		1.89E-02	NoA
195	13	N-Nitrosodiphenylamine	3.90E-01	mg/kg		3.22E+01	NoA
195	13	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	13	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
195	13	Phenanthrene	3.90E-01	mg/kg			NoC
195	13	Phenol	3.90E-01	mg/kg		4.98E+02	NoA
195	13	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
195	13	Pyrene	3.90E-01	mg/kg		8.12E+01	NoA
195	13	Pyridine	7.90E-01	mg/kg		7.82E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	13	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	13	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	13	Total PAH	7.90E-03	mg/kg		1.97E-02	NoA
195	13	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	14	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
195	14	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
195	14	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
195	14	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
195	14	2,4,5-Trichlorophenol	4.20E-01	mg/kg		3.26E+02	NoA
195	14	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
195	14	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
195	14	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
195	14	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
195	14	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
195	14	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
195	14	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
195	14	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
195	14	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
195	14	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
195	14	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
195	14	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
195	14	2-Nitrophenol	4.20E-01	mg/kg			NoC
195	14	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
195	14	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
195	14	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	14	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
195	14	4-Chlorobenzenamine	4.20E-01	mg/kg		8.66E-01	NoA
195	14	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
195	14	4-Nitrophenol	2.00E+00	mg/kg			NoC
195	14	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
195	14	Acenaphthylene	4.20E-01	mg/kg			NoC
195	14	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
195	14	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	14	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
195	14	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
195	14	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
195	14	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
195	14	Bis(2-chloroethyl) ether	8.30E-03	mg/kg		2.14E-01	NoA
195	14	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
195	14	Bis(2-ethylhexyl)phthalate	4.20E-01	mg/kg		1.25E+01	NoA
195	14	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
195	14	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	14	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
195	14	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
195	14	Dimethyl phthalate	4.20E-01	mg/kg			NoC
195	14	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA
195	14	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
195	14	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
195	14	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	14	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
195	14	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
195	14	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
195	14	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
195	14	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
195	14	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	14	m,p-Cresol	8.30E-01	mg/kg		3.91E+01	NoA
195	14	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	14	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	14	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
195	14	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
195	14	N-Nitroso-di-n-propylamine	8.30E-03	mg/kg		1.89E-02	NoA
195	14	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
195	14	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	14	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
195	14	Phenanthrene	4.20E-01	mg/kg			NoC
195	14	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
195	14	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
195	14	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
195	14	Pyridine	8.30E-01	mg/kg		7.82E+00	NoA
195	14	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	14	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	14	Sodium	1.26E+02	mg/kg	3.20E+02		NoBE
195	14	Total PAH	8.30E-03	mg/kg		1.97E-02	NoA
195	14	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	15	1,2,4-Trichlorobenzene	4.50E-01	mg/kg		7.86E-01	NoA
195	15	1,2-Dichlorobenzene	4.50E-01	mg/kg		2.92E+01	NoA
195	15	1,3-Dichlorobenzene	4.50E-01	mg/kg			NoC
195	15	1,4-Dichlorobenzene	4.50E-01	mg/kg		8.13E-01	NoA
195	15	2,4,5-Trichlorophenol	4.50E-01	mg/kg		3.26E+02	NoA
195	15	2,4,6-Trichlorophenol	4.50E-01	mg/kg		3.26E+00	NoA
195	15	2,4-Dichlorophenol	4.50E-01	mg/kg		9.78E+00	NoA
195	15	2,4-Dimethylphenol	4.50E-01	mg/kg		6.52E+01	NoA
195	15	2,4-Dinitrophenol	2.20E+00	mg/kg		6.52E+00	NoA
195	15	2,4-Dinitrotoluene	4.50E-01	mg/kg		5.63E-01	NoA
195	15	2,6-Dinitrotoluene	4.50E-01	mg/kg		3.26E+00	NoA
195	15	2-Chloronaphthalene	4.50E-01	mg/kg		6.26E+02	NoA
195	15	2-Chlorophenol	4.50E-01	mg/kg		3.91E+01	NoA
195	15	2-Methyl-4,6-dinitrophenol	2.20E+00	mg/kg		2.61E-01	Yes
195	15	2-Methylnaphthalene	4.50E-01	mg/kg		1.30E+01	NoA
195	15	2-Methylphenol	4.50E-01	mg/kg		1.54E+02	NoA
195	15	2-Nitrobenzenamine	2.20E+00	mg/kg		2.96E-01	Yes
195	15	2-Nitrophenol	4.50E-01	mg/kg			NoC
195	15	3,3'-Dichlorobenzidine	2.20E+00	mg/kg		3.85E-01	Yes
195	15	3-Nitrobenzenamine	2.20E+00	mg/kg		9.78E-01	Yes
195	15	4-Bromophenyl phenyl ether	4.50E-01	mg/kg			NoC
195	15	4-Chloro-3-methylphenol	4.50E-01	mg/kg			NoC
195	15	4-Chlorobenzenamine	4.50E-01	mg/kg		8.66E-01	NoA
195	15	4-Chlorophenyl phenyl ether	4.50E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	15	4-Nitrophenol	2.20E+00	mg/kg			NoC
195	15	Acenaphthene	4.50E-01	mg/kg		1.17E+02	NoA
195	15	Acenaphthylene	4.50E-01	mg/kg			NoC
195	15	Anthracene	4.50E-01	mg/kg		7.47E+02	NoA
195	15	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	15	Benzenemethanol	4.50E-01	mg/kg		3.26E+02	NoA
195	15	Benzo(ghi)perylene	4.50E-01	mg/kg			NoC
195	15	Benzoic acid	2.20E+00	mg/kg		1.30E+04	NoA
195	15	Bis(2-chloroethoxy)methane	4.50E-01	mg/kg		9.78E+00	NoA
195	15	Bis(2-chloroethyl) ether	9.00E-03	mg/kg		2.14E-01	NoA
195	15	Bis(2-chloroisopropyl) ether	4.50E-01	mg/kg		4.57E+00	NoA
195	15	Bis(2-ethylhexyl)phthalate	4.50E-01	mg/kg		1.25E+01	NoA
195	15	Butyl benzyl phthalate	4.50E-01	mg/kg		9.18E+01	NoA
195	15	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	15	Dibenzofuran	4.50E-01	mg/kg		3.26E+00	NoA
195	15	Diethyl phthalate	4.50E-01	mg/kg		2.61E+03	NoA
195	15	Dimethyl phthalate	4.50E-01	mg/kg			NoC
195	15	Di-n-butyl phthalate	4.50E-01	mg/kg		3.26E+02	NoA
195	15	Di-n-octylphthalate	4.50E-01	mg/kg		1.30E+02	NoA
195	15	Fluoranthene	4.50E-01	mg/kg		1.09E+02	NoA
195	15	Fluorene	4.50E-01	mg/kg		9.15E+01	NoA
195	15	Hexachlorobenzene	4.50E-01	mg/kg		4.92E-02	Yes
195	15	Hexachlorobutadiene	4.50E-01	mg/kg		2.22E+00	NoA
195	15	Hexachlorocyclopentadiene	2.20E+00	mg/kg		1.95E+01	NoA
195	15	Hexachloroethane	4.50E-01	mg/kg		2.28E+00	NoA
195	15	Isophorone	4.50E-01	mg/kg		1.82E+02	NoA
195	15	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	15	m,p-Cresol	9.00E-01	mg/kg		3.91E+01	NoA
195	15	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	15	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	15	Naphthalene	4.50E-01	mg/kg		1.15E+00	NoA
195	15	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
195	15	Nitrobenzene	2.20E+00	mg/kg		4.79E+00	NoA
195	15	N-Nitroso-di-n-propylamine	9.00E-03	mg/kg		1.89E-02	NoA
195	15	N-Nitrosodiphenylamine	4.50E-01	mg/kg		3.22E+01	NoA
195	15	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	15	Pentachlorophenol	2.20E+00	mg/kg		4.36E-01	Yes
195	15	Phenanthrene	4.50E-01	mg/kg			NoC
195	15	Phenol	4.50E-01	mg/kg		4.98E+02	NoA
195	15	p-Nitroaniline	2.20E+00	mg/kg		8.66E+00	NoA
195	15	Pyrene	4.50E-01	mg/kg		8.12E+01	NoA
195	15	Pyridine	9.00E-01	mg/kg		7.82E+00	NoA
195	15	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	15	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	15	Thallium	2.70E-01	mg/kg	2.10E-01	3.68E-01	NoA
195	15	Total PAH	9.00E-03	mg/kg		1.97E-02	NoA
195	15	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	16	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
195	16	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	16	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
195	16	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
195	16	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
195	16	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
195	16	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
195	16	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
195	16	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
195	16	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
195	16	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA
195	16	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
195	16	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
195	16	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
195	16	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
195	16	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
195	16	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
195	16	2-Nitrophenol	4.00E-01	mg/kg			NoC
195	16	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
195	16	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
195	16	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
195	16	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
195	16	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
195	16	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC
195	16	4-Nitrophenol	1.90E+00	mg/kg			NoC
195	16	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
195	16	Acenaphthylene	4.00E-01	mg/kg			NoC
195	16	Anthracene	4.00E-01	mg/kg		7.47E+02	NoA
195	16	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	16	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
195	16	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
195	16	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
195	16	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA
195	16	Bis(2-chloroethyl) ether	7.90E-03	mg/kg		2.14E-01	NoA
195	16	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
195	16	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
195	16	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
195	16	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	16	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
195	16	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
195	16	Dimethyl phthalate	4.00E-01	mg/kg			NoC
195	16	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
195	16	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
195	16	Fluoranthene	4.00E-01	mg/kg		1.09E+02	NoA
195	16	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
195	16	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
195	16	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
195	16	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
195	16	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
195	16	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA
195	16	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	16	m,p-Cresol	7.90E-01	mg/kg		3.91E+01	NoA
195	16	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
195	16	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	16	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
195	16	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
195	16	N-Nitroso-di-n-propylamine	7.90E-03	mg/kg		1.89E-02	NoA
195	16	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
195	16	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
195	16	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
195	16	Phenanthrene	4.00E-01	mg/kg			NoC
195	16	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
195	16	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
195	16	Pyrene	4.00E-01	mg/kg		8.12E+01	NoA
195	16	Pyridine	7.90E-01	mg/kg		7.82E+00	NoA
195	16	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	16	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
195	16	Thallium	2.40E-01	mg/kg	2.10E-01	3.68E-01	NoA
195	16	Total PAH	7.90E-03	mg/kg		1.97E-02	NoA
195	16	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
195	17	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
195	17	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
195	17	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
195	17	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
195	17	2,4,5-Trichlorophenol	4.10E-01	mg/kg		3.26E+02	NoA
195	17	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
195	17	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
195	17	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
195	17	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
195	17	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
195	17	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA
195	17	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
195	17	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
195	17	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
195	17	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
195	17	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
195	17	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
195	17	2-Nitrophenol	4.10E-01	mg/kg			NoC
195	17	3,3'-Dichlorobenzidine	2.00E+00	mg/kg		3.85E-01	Yes
195	17	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
195	17	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
195	17	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
195	17	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
195	17	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
195	17	4-Nitrophenol	2.00E+00	mg/kg			NoC
195	17	Acenaphthene	4.10E-01	mg/kg		1.17E+02	NoA
195	17	Acenaphthylene	4.10E-01	mg/kg			NoC
195	17	Anthracene	4.10E-01	mg/kg		7.47E+02	NoA
195	17	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
195	17	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
195	17	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
195	17	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
195	17	Bis(2-chloroethyl) ether	8.20E-03	mg/kg		2.14E-01	NoA
195	17	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
195	17	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
195	17	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
195	17	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
195	17	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
195	17	Dimethyl phthalate	4.10E-01	mg/kg			NoC
195	17	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
195	17	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
195	17	Fluorene	4.10E-01	mg/kg		9.15E+01	NoA
195	17	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
195	17	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
195	17	Hexachlorocyclopentadiene	2.00E+00	mg/kg		1.95E+01	NoA
195	17	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
195	17	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
195	17	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
195	17	m,p-Cresol	8.20E-01	mg/kg		3.91E+01	NoA
195	17	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
195	17	Naphthalene	4.10E-01	mg/kg		1.15E+00	NoA
195	17	Nitrobenzene	2.00E+00	mg/kg		4.79E+00	NoA
195	17	N-Nitroso-di-n-propylamine	8.20E-03	mg/kg		1.89E-02	NoA
195	17	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
195	17	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
195	17	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
195	17	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
195	17	Pyridine	8.20E-01	mg/kg		7.82E+00	NoA
195	17	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
195	17	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
492	1	1,1,1-Trichloroethane	6.00E-03	mg/kg		1.46E+02	NoA
492	1	1,1,2,2-Tetrachloroethane	6.00E-03	mg/kg		5.62E-01	NoA
492	1	1,1,2-Trichloroethane	6.00E-03	mg/kg		2.30E-02	NoA
492	1	1,1-Dichloroethane	6.00E-03	mg/kg		1.34E+00	NoA
492	1	1,1-Dichloroethene	6.00E-03	mg/kg		2.37E-02	NoA
492	1	1,2,4-Trichlorobenzene	4.10E-01	mg/kg		7.86E-01	NoA
492	1	1,2-Dichlorobenzene	4.10E-01	mg/kg		2.92E+01	NoA
492	1	1,2-Dichloroethane	6.00E-03	mg/kg		1.55E-01	NoA
492	1	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
492	1	1,2-Dichloropropane	6.00E-03	mg/kg		9.40E-01	NoA
492	1	1,3-Dichlorobenzene	4.10E-01	mg/kg			NoC
492	1	1,4-Dichlorobenzene	4.10E-01	mg/kg		8.13E-01	NoA
492	1	2,4,5-Trichlorophenol	2.00E+00	mg/kg		3.26E+02	NoA
492	1	2,4,6-Trichlorophenol	4.10E-01	mg/kg		3.26E+00	NoA
492	1	2,4-Dichlorophenol	4.10E-01	mg/kg		9.78E+00	NoA
492	1	2,4-Dimethylphenol	4.10E-01	mg/kg		6.52E+01	NoA
492	1	2,4-Dinitrophenol	2.00E+00	mg/kg		6.52E+00	NoA
492	1	2,4-Dinitrotoluene	4.10E-01	mg/kg		5.63E-01	NoA
492	1	2,6-Dinitrotoluene	4.10E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
492	1	2-Butanone	1.20E-02	mg/kg		5.78E+02	NoA
492	1	2-Chloronaphthalene	4.10E-01	mg/kg		6.26E+02	NoA
492	1	2-Chlorophenol	4.10E-01	mg/kg		3.91E+01	NoA
492	1	2-Hexanone	1.20E-02	mg/kg		4.05E+00	NoA
492	1	2-Methyl-4,6-dinitrophenol	2.00E+00	mg/kg		2.61E-01	Yes
492	1	2-Methylnaphthalene	4.10E-01	mg/kg		1.30E+01	NoA
492	1	2-Methylphenol	4.10E-01	mg/kg		1.54E+02	NoA
492	1	2-Nitrobenzenamine	2.00E+00	mg/kg		2.96E-01	Yes
492	1	2-Nitrophenol	4.10E-01	mg/kg			NoC
492	1	3,3'-Dichlorobenzidine	8.20E-01	mg/kg		3.85E-01	Yes
492	1	3-Nitrobenzenamine	2.00E+00	mg/kg		9.78E-01	Yes
492	1	4-Bromophenyl phenyl ether	4.10E-01	mg/kg			NoC
492	1	4-Chloro-3-methylphenol	4.10E-01	mg/kg			NoC
492	1	4-Chlorobenzenamine	4.10E-01	mg/kg		8.66E-01	NoA
492	1	4-Chlorophenyl phenyl ether	4.10E-01	mg/kg			NoC
492	1	4-Methyl-2-pentanone	1.20E-02	mg/kg		1.13E+02	NoA
492	1	4-Nitrophenol	2.00E+00	mg/kg			NoC
492	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
492	1	Acenaphthylene	5.00E-01	mg/kg			NoC
492	1	Acetone	3.20E-02	mg/kg		1.34E+03	NoA
492	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
492	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
492	1	Benzene	6.00E-03	mg/kg		3.33E-01	NoA
492	1	Benzenemethanol	4.10E-01	mg/kg		3.26E+02	NoA
492	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
492	1	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
492	1	Bis(2-chloroethoxy)methane	4.10E-01	mg/kg		9.78E+00	NoA
492	1	Bis(2-chloroethyl) ether	4.10E-01	mg/kg		2.14E-01	Yes
492	1	Bis(2-chloroisopropyl) ether	4.10E-01	mg/kg		4.57E+00	NoA
492	1	Bis(2-ethylhexyl)phthalate	4.10E-01	mg/kg		1.25E+01	NoA
492	1	Bromodichloromethane	6.00E-03	mg/kg		2.73E-01	NoA
492	1	Bromoform	6.00E-03	mg/kg		2.19E+01	NoA
492	1	Bromomethane	1.20E-02	mg/kg		1.34E-01	NoA
492	1	Butyl benzyl phthalate	4.10E-01	mg/kg		9.18E+01	NoA
492	1	Carbon disulfide	6.00E-03	mg/kg		1.48E+01	NoA
492	1	Carbon tetrachloride	6.00E-03	mg/kg		2.39E-01	NoA
492	1	Chlorobenzene	6.00E-03	mg/kg		4.07E+00	NoA
492	1	Chloroethane	1.20E-02	mg/kg		1.45E+03	NoA
492	1	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
492	1	Chloromethane	1.20E-02	mg/kg		1.65E+00	NoA
492	1	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
492	1	Dibenzofuran	4.10E-01	mg/kg		3.26E+00	NoA
492	1	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA
492	1	Diethyl phthalate	4.10E-01	mg/kg		2.61E+03	NoA
492	1	Dimethyl phthalate	4.10E-01	mg/kg			NoC
492	1	Di-n-butyl phthalate	4.10E-01	mg/kg		3.26E+02	NoA
492	1	Di-n-octylphthalate	4.10E-01	mg/kg		1.30E+02	NoA
492	1	Ethylbenzene	6.00E-03	mg/kg		1.58E+00	NoA
492	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
492	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
492	1	Hexachlorobenzene	4.10E-01	mg/kg		4.92E-02	Yes
492	1	Hexachlorobutadiene	4.10E-01	mg/kg		2.22E+00	NoA
492	1	Hexachlorocyclopentadiene	4.10E-01	mg/kg		1.95E+01	NoA
492	1	Hexachloroethane	4.10E-01	mg/kg		2.28E+00	NoA
492	1	Isophorone	4.10E-01	mg/kg		1.82E+02	NoA
492	1	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
492	1	Mercury	2.00E-01	mg/kg	2.00E-01	2.13E-01	NoA
492	1	Methylene chloride	6.00E-03	mg/kg		3.65E+00	NoA
492	1	Molybdenum	4.68E+00	mg/kg		2.30E+01	NoA
492	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
492	1	Nitrobenzene	4.10E-01	mg/kg		4.79E+00	NoA
492	1	N-Nitroso-di-n-propylamine	4.10E-01	mg/kg		1.89E-02	Yes
492	1	N-Nitrosodiphenylamine	4.10E-01	mg/kg		3.22E+01	NoA
492	1	Pentachlorophenol	2.00E+00	mg/kg		4.36E-01	Yes
492	1	Phenanthrene	5.00E-01	mg/kg			NoC
492	1	Phenol	4.10E-01	mg/kg		4.98E+02	NoA
492	1	p-Nitroaniline	2.00E+00	mg/kg		8.66E+00	NoA
492	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
492	1	Selenium	9.37E-01	mg/kg	8.00E-01	2.30E+01	NoA
492	1	Silver	4.00E+00	mg/kg	2.30E+00	2.61E+00	Yes
492	1	Sodium	2.00E+02	mg/kg	3.20E+02		NoBE
492	1	Styrene	6.00E-03	mg/kg		9.43E+01	NoA
492	1	Tetrachloroethene	6.00E-03	mg/kg		1.13E-01	NoA
492	1	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
492	1	Toluene	6.00E-03	mg/kg		9.61E+01	NoA
492	1	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
492	1	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
492	1	trans-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
492	1	Trichloroethene	6.00E-03	mg/kg		2.34E-02	NoA
492	1	Vinyl acetate	1.20E-02	mg/kg		1.83E+01	NoA
492	1	Vinyl chloride	1.20E-02	mg/kg		8.24E-02	NoA
493	1	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
493	1	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
493	1	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
493	1	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
493	1	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
493	1	1,2,4-Trichlorobenzene	5.00E-01	mg/kg		7.86E-01	NoA
493	1	1,2-Dichlorobenzene	5.00E-01	mg/kg		2.92E+01	NoA
493	1	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
493	1	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
493	1	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
493	1	1,3-Dichlorobenzene	5.00E-01	mg/kg			NoC
493	1	1,4-Dichlorobenzene	5.00E-01	mg/kg		8.13E-01	NoA
493	1	2,4,5-Trichlorophenol	5.00E-01	mg/kg		3.26E+02	NoA
493	1	2,4,6-Trichlorophenol	5.00E-01	mg/kg		3.26E+00	NoA
493	1	2,4-Dichlorophenol	5.00E-01	mg/kg		9.78E+00	NoA
493	1	2,4-Dimethylphenol	5.00E-01	mg/kg		6.52E+01	NoA
493	1	2,4-Dinitrophenol	5.00E-01	mg/kg		6.52E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
493	1	2,4-Dinitrotoluene	5.00E-01	mg/kg		5.63E-01	NoA
493	1	2,6-Dinitrotoluene	5.00E-01	mg/kg		3.26E+00	NoA
493	1	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
493	1	2-Chloronaphthalene	5.00E-01	mg/kg		6.26E+02	NoA
493	1	2-Chlorophenol	5.00E-01	mg/kg		3.91E+01	NoA
493	1	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
493	1	2-Methyl-4,6-dinitrophenol	5.00E-01	mg/kg		2.61E-01	Yes
493	1	2-Methylnaphthalene	5.00E-01	mg/kg		1.30E+01	NoA
493	1	2-Methylphenol	5.00E-01	mg/kg		1.54E+02	NoA
493	1	2-Nitrobenzenamine	5.00E-01	mg/kg		2.96E-01	Yes
493	1	2-Nitrophenol	5.00E-01	mg/kg			NoC
493	1	3,3'-Dichlorobenzidine	5.00E-01	mg/kg		3.85E-01	Yes
493	1	3-Nitrobenzenamine	5.00E-01	mg/kg		9.78E-01	NoA
493	1	4-Bromophenyl phenyl ether	5.00E-01	mg/kg			NoC
493	1	4-Chloro-3-methylphenol	5.00E-01	mg/kg			NoC
493	1	4-Chlorobenzenamine	5.00E-01	mg/kg		8.66E-01	NoA
493	1	4-Chlorophenyl phenyl ether	5.00E-01	mg/kg			NoC
493	1	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
493	1	4-Nitrophenol	5.00E-01	mg/kg			NoC
493	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
493	1	Acenaphthylene	5.00E-01	mg/kg			NoC
493	1	Acetone	1.00E-02	mg/kg		1.34E+03	NoA
493	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
493	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
493	1	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
493	1	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
493	1	Benzenemethanol	5.00E-01	mg/kg		3.26E+02	NoA
493	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
493	1	Benzoic acid	5.00E-01	mg/kg		1.30E+04	NoA
493	1	Bis(2-chloroethoxy)methane	5.00E-01	mg/kg		9.78E+00	NoA
493	1	Bis(2-chloroethyl) ether	5.00E-01	mg/kg		2.14E-01	Yes
493	1	Bis(2-chloroisopropyl) ether	5.00E-01	mg/kg		4.57E+00	NoA
493	1	Bis(2-ethylhexyl)phthalate	5.00E-01	mg/kg		1.25E+01	NoA
493	1	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
493	1	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
493	1	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
493	1	Butyl benzyl phthalate	5.00E-01	mg/kg		9.18E+01	NoA
493	1	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
493	1	Carbazole	5.00E-01	mg/kg		8.72E+00	NoA
493	1	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
493	1	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
493	1	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
493	1	cis-1,2-Dichloroethene	1.00E-02	mg/kg		1.05E+00	NoA
493	1	cis-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
493	1	Dibenzofuran	5.00E-01	mg/kg		3.26E+00	NoA
493	1	Diethyl phthalate	5.00E-01	mg/kg		2.61E+03	NoA
493	1	Dimethyl phthalate	5.00E-01	mg/kg			NoC
493	1	Di-n-butyl phthalate	5.00E-01	mg/kg		3.26E+02	NoA
493	1	Di-n-octylphthalate	5.00E-01	mg/kg		1.30E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
493	1	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
493	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
493	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
493	1	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
493	1	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
493	1	Hexachlorocyclopentadiene	5.00E-01	mg/kg		1.95E+01	NoA
493	1	Hexachloroethane	5.00E-01	mg/kg		2.28E+00	NoA
493	1	Isophorone	5.00E-01	mg/kg		1.82E+02	NoA
493	1	Lead	2.00E+02	mg/kg	3.60E+01	4.00E+02	NoA
493	1	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
493	1	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
493	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
493	1	Nitrobenzene	5.00E-01	mg/kg		4.79E+00	NoA
493	1	N-Nitroso-di-n-propylamine	5.00E-01	mg/kg		1.89E-02	Yes
493	1	N-Nitrosodiphenylamine	5.00E-01	mg/kg		3.22E+01	NoA
493	1	Pentachlorophenol	5.00E-01	mg/kg		4.36E-01	Yes
493	1	Phenanthrene	5.00E-01	mg/kg			NoC
493	1	Phenol	5.00E-01	mg/kg		4.98E+02	NoA
493	1	p-Nitroaniline	5.00E-01	mg/kg		8.66E+00	NoA
493	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
493	1	Pyridine	5.00E-01	mg/kg		7.82E+00	NoA
493	1	Selenium	1.00E+00	mg/kg	8.00E-01	2.30E+01	NoA
493	1	Silver	4.00E+00	mg/kg	2.30E+00	2.61E+00	Yes
493	1	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
493	1	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
493	1	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
493	1	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
493	1	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
493	1	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
493	1	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
493	1	Uranium	2.00E+03	mg/kg	4.90E+00	1.38E+01	Yes
493	1	Vinyl chloride	1.00E-02	mg/kg		8.24E-02	NoA
493	1	Zinc	2.00E+02	mg/kg	6.50E+01	1.38E+03	NoA
517	1	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
517	1	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
517	1	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
517	1	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
517	1	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
517	1	1,2,4-Trichlorobenzene	4.90E-01	mg/kg		7.86E-01	NoA
517	1	1,2-Dichlorobenzene	4.90E-01	mg/kg		2.92E+01	NoA
517	1	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
517	1	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
517	1	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
517	1	1,3-Dichlorobenzene	4.90E-01	mg/kg			NoC
517	1	1,4-Dichlorobenzene	4.90E-01	mg/kg		8.13E-01	NoA
517	1	2,4,5-Trichlorophenol	4.90E-01	mg/kg		3.26E+02	NoA
517	1	2,4,6-Trichlorophenol	4.90E-01	mg/kg		3.26E+00	NoA
517	1	2,4-Dichlorophenol	4.90E-01	mg/kg		9.78E+00	NoA
517	1	2,4-Dimethylphenol	4.90E-01	mg/kg		6.52E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
517	1	2,4-Dinitrophenol	4.90E-01	mg/kg		6.52E+00	NoA
517	1	2,4-Dinitrotoluene	4.90E-01	mg/kg		5.63E-01	NoA
517	1	2,6-Dinitrotoluene	4.90E-01	mg/kg		3.26E+00	NoA
517	1	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
517	1	2-Chloronaphthalene	4.90E-01	mg/kg		6.26E+02	NoA
517	1	2-Chlorophenol	4.90E-01	mg/kg		3.91E+01	NoA
517	1	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
517	1	2-Methyl-4,6-dinitrophenol	4.90E-01	mg/kg		2.61E-01	Yes
517	1	2-Methylnaphthalene	4.90E-01	mg/kg		1.30E+01	NoA
517	1	2-Methylphenol	4.90E-01	mg/kg		1.54E+02	NoA
517	1	2-Nitrobenzamine	4.90E-01	mg/kg		2.96E-01	Yes
517	1	2-Nitrophenol	4.90E-01	mg/kg			NoC
517	1	3,3'-Dichlorobenzidine	4.90E-01	mg/kg		3.85E-01	Yes
517	1	3-Nitrobenzamine	4.90E-01	mg/kg		9.78E-01	NoA
517	1	4-Bromophenyl phenyl ether	4.90E-01	mg/kg			NoC
517	1	4-Chloro-3-methylphenol	4.90E-01	mg/kg			NoC
517	1	4-Chlorobenzamine	4.90E-01	mg/kg		8.66E-01	NoA
517	1	4-Chlorophenyl phenyl ether	4.90E-01	mg/kg			NoC
517	1	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
517	1	4-Nitrophenol	4.90E-01	mg/kg			NoC
517	1	Acenaphthene	4.90E-01	mg/kg		1.17E+02	NoA
517	1	Acenaphthylene	4.90E-01	mg/kg			NoC
517	1	Acetone	1.00E-02	mg/kg		1.34E+03	NoA
517	1	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
517	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
517	1	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
517	1	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
517	1	Benzenemethanol	4.90E-01	mg/kg		3.26E+02	NoA
517	1	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
517	1	Benzoic acid	4.90E-01	mg/kg		1.30E+04	NoA
517	1	Bis(2-chloroethoxy)methane	4.90E-01	mg/kg		9.78E+00	NoA
517	1	Bis(2-chloroethyl) ether	4.90E-01	mg/kg		2.14E-01	Yes
517	1	Bis(2-chloroisopropyl) ether	4.90E-01	mg/kg		4.57E+00	NoA
517	1	Bis(2-ethylhexyl)phthalate	4.90E-01	mg/kg		1.25E+01	NoA
517	1	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
517	1	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
517	1	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
517	1	Butyl benzyl phthalate	4.90E-01	mg/kg		9.18E+01	NoA
517	1	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
517	1	Carbazole	4.90E-01	mg/kg		8.72E+00	NoA
517	1	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
517	1	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
517	1	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
517	1	cis-1,2-Dichloroethene	1.00E-02	mg/kg		1.05E+00	NoA
517	1	cis-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
517	1	Dibenzofuran	4.90E-01	mg/kg		3.26E+00	NoA
517	1	Diethyl phthalate	4.90E-01	mg/kg		2.61E+03	NoA
517	1	Dimethyl phthalate	4.90E-01	mg/kg			NoC
517	1	Di-n-butyl phthalate	4.80E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
517	1	Di-n-octylphthalate	4.90E-01	mg/kg		1.30E+02	NoA
517	1	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
517	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
517	1	Fluorene	4.90E-01	mg/kg		9.15E+01	NoA
517	1	Hexachlorobenzene	4.90E-01	mg/kg		4.92E-02	Yes
517	1	Hexachlorobutadiene	4.90E-01	mg/kg		2.22E+00	NoA
517	1	Hexachlorocyclopentadiene	4.90E-01	mg/kg		1.95E+01	NoA
517	1	Hexachloroethane	4.90E-01	mg/kg		2.28E+00	NoA
517	1	Isophorone	4.90E-01	mg/kg		1.82E+02	NoA
517	1	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
517	1	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
517	1	Mercury	2.00E-01	mg/kg	2.00E-01	2.13E-01	NoA
517	1	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
517	1	Naphthalene	4.90E-01	mg/kg		1.15E+00	NoA
517	1	Nitrobenzene	4.90E-01	mg/kg		4.79E+00	NoA
517	1	N-Nitroso-di-n-propylamine	4.90E-01	mg/kg		1.89E-02	Yes
517	1	N-Nitrosodiphenylamine	4.90E-01	mg/kg		3.22E+01	NoA
517	1	Pentachlorophenol	4.90E-01	mg/kg		4.36E-01	Yes
517	1	Phenanthrene	4.90E-01	mg/kg			NoC
517	1	Phenol	4.90E-01	mg/kg		4.98E+02	NoA
517	1	p-Nitroaniline	4.90E-01	mg/kg		8.66E+00	NoA
517	1	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
517	1	Pyridine	4.90E-01	mg/kg		7.82E+00	NoA
517	1	Selenium	1.00E+00	mg/kg	8.00E-01	2.30E+01	NoA
517	1	Silver	2.50E+00	mg/kg	2.30E+00	2.61E+00	NoA
517	1	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
517	1	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
517	1	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
517	1	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
517	1	Total PAH	4.90E-01	mg/kg		1.97E-02	Yes
517	1	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
517	1	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
517	1	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
517	1	Uranium	1.00E+02	mg/kg	4.90E+00	1.38E+01	Yes
517	1	Vinyl chloride	1.00E-02	mg/kg		8.24E-02	NoA
541	1	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
541	1	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
541	1	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
541	1	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
541	1	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
541	1	1,2,4-Trichlorobenzene	5.00E-01	mg/kg		7.86E-01	NoA
541	1	1,2-Dichlorobenzene	5.00E-01	mg/kg		2.92E+01	NoA
541	1	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
541	1	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
541	1	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
541	1	1,3-Dichlorobenzene	5.00E-01	mg/kg			NoC
541	1	1,4-Dichlorobenzene	5.00E-01	mg/kg		8.13E-01	NoA
541	1	2,4,5-Trichlorophenol	5.00E-01	mg/kg		3.26E+02	NoA
541	1	2,4,6-Trichlorophenol	5.00E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
541	1	2,4-Dichlorophenol	5.00E-01	mg/kg		9.78E+00	NoA
541	1	2,4-Dimethylphenol	5.00E-01	mg/kg		6.52E+01	NoA
541	1	2,4-Dinitrophenol	5.00E-01	mg/kg		6.52E+00	NoA
541	1	2,4-Dinitrotoluene	5.00E-01	mg/kg		5.63E-01	NoA
541	1	2,6-Dinitrotoluene	5.00E-01	mg/kg		3.26E+00	NoA
541	1	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
541	1	2-Chloronaphthalene	5.00E-01	mg/kg		6.26E+02	NoA
541	1	2-Chlorophenol	5.00E-01	mg/kg		3.91E+01	NoA
541	1	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
541	1	2-Methyl-4,6-dinitrophenol	5.00E-01	mg/kg		2.61E-01	Yes
541	1	2-Methylnaphthalene	5.00E-01	mg/kg		1.30E+01	NoA
541	1	2-Methylphenol	5.00E-01	mg/kg		1.54E+02	NoA
541	1	2-Nitrobenzenamine	5.00E-01	mg/kg		2.96E-01	Yes
541	1	2-Nitrophenol	5.00E-01	mg/kg			NoC
541	1	3,3'-Dichlorobenzidine	5.00E-01	mg/kg		3.85E-01	Yes
541	1	3-Nitrobenzenamine	5.00E-01	mg/kg		9.78E-01	NoA
541	1	4-Bromophenyl phenyl ether	5.00E-01	mg/kg			NoC
541	1	4-Chloro-3-methylphenol	5.00E-01	mg/kg			NoC
541	1	4-Chlorobenzenamine	5.00E-01	mg/kg		8.66E-01	NoA
541	1	4-Chlorophenyl phenyl ether	5.00E-01	mg/kg			NoC
541	1	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
541	1	4-Nitrophenol	5.00E-01	mg/kg			NoC
541	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
541	1	Acenaphthylene	5.00E-01	mg/kg			NoC
541	1	Acetone	1.00E-02	mg/kg		1.34E+03	NoA
541	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
541	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
541	1	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
541	1	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
541	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
541	1	Bis(2-chloroethoxy)methane	5.00E-01	mg/kg		9.78E+00	NoA
541	1	Bis(2-chloroethyl) ether	5.00E-01	mg/kg		2.14E-01	Yes
541	1	Bis(2-chloroisopropyl) ether	5.00E-01	mg/kg		4.57E+00	NoA
541	1	Bis(2-ethylhexyl)phthalate	5.00E-01	mg/kg		1.25E+01	NoA
541	1	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
541	1	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
541	1	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
541	1	Butyl benzyl phthalate	5.00E-01	mg/kg		9.18E+01	NoA
541	1	Carbazole	5.00E-01	mg/kg		8.72E+00	NoA
541	1	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
541	1	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
541	1	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
541	1	Chloroethane	1.00E-02	mg/kg		1.45E+03	NoA
541	1	Chloroform	1.00E-02	mg/kg		1.22E-01	NoA
541	1	Chloromethane	1.00E-02	mg/kg		1.65E+00	NoA
541	1	cis-1,2-Dichloroethene	1.00E-02	mg/kg		1.05E+00	NoA
541	1	cis-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
541	1	Copper	1.20E+01	mg/kg	1.90E+01	1.84E+02	NoAB
541	1	Dibenzofuran	5.00E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
541	1	Dibromochloromethane	1.00E-02	mg/kg		2.42E-01	NoA
541	1	Diethyl phthalate	5.00E-01	mg/kg		2.61E+03	NoA
541	1	Dimethyl phthalate	5.00E-01	mg/kg			NoC
541	1	Di-n-butyl phthalate	4.90E-01	mg/kg		3.26E+02	NoA
541	1	Di-n-octylphthalate	5.00E-01	mg/kg		1.30E+02	NoA
541	1	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
541	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
541	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
541	1	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
541	1	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
541	1	Hexachlorocyclopentadiene	5.00E-01	mg/kg		1.95E+01	NoA
541	1	Hexachloroethane	5.00E-01	mg/kg		2.28E+00	NoA
541	1	Isophorone	5.00E-01	mg/kg		1.82E+02	NoA
541	1	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
541	1	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
541	1	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
541	1	Molybdenum	5.00E+00	mg/kg		2.30E+01	NoA
541	1	Nitrobenzene	5.00E-01	mg/kg		4.79E+00	NoA
541	1	N-Nitroso-di-n-propylamine	5.00E-01	mg/kg		1.89E-02	Yes
541	1	N-Nitrosodiphenylamine	5.00E-01	mg/kg		3.22E+01	NoA
541	1	Pentachlorophenol	5.00E-01	mg/kg		4.36E-01	Yes
541	1	Phenanthrene	5.00E-01	mg/kg			NoC
541	1	Phenol	5.00E-01	mg/kg		4.98E+02	NoA
541	1	p-Nitroaniline	5.00E-01	mg/kg		8.66E+00	NoA
541	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
541	1	Pyridine	5.00E-01	mg/kg		7.82E+00	NoA
541	1	Selenium	4.97E+00	mg/kg	8.00E-01	2.30E+01	NoA
541	1	Silver	2.50E+00	mg/kg	2.30E+00	2.61E+00	NoA
541	1	Sodium	2.50E+02	mg/kg	3.20E+02		NoBE
541	1	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
541	1	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
541	1	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
541	1	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
541	1	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
541	1	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
541	1	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
541	1	Vinyl chloride	1.00E-02	mg/kg		8.24E-02	NoA
541	1	Zinc	1.94E+01	mg/kg	6.50E+01	1.38E+03	NoAB
561	1	1,1,1-Trichloroethane	5.00E-03	mg/kg		1.46E+02	NoA
561	1	1,1,2-Trichloroethane	5.00E-03	mg/kg		2.30E-02	NoA
561	1	1,1-Dichloroethane	5.00E-03	mg/kg		1.34E+00	NoA
561	1	1,1-Dichloroethene	5.00E-03	mg/kg		2.37E-02	NoA
561	1	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
561	1	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
561	1	1,2-Dichloroethane	5.00E-03	mg/kg		1.55E-01	NoA
561	1	1,2-Dimethylbenzene	5.00E-03	mg/kg		5.35E+01	NoA
561	1	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
561	1	1,4-Dichlorobenzene	5.00E-01	mg/kg		8.13E-01	NoA
561	1	2,4,5-Trichlorophenol	5.00E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
561	1	2,4,6-Trichlorophenol	5.00E-01	mg/kg		3.26E+00	NoA
561	1	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
561	1	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
561	1	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA
561	1	2,4-Dinitrotoluene	5.00E-01	mg/kg		5.63E-01	NoA
561	1	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
561	1	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA
561	1	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
561	1	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
561	1	2-Methylnaphthalene	4.40E-01	mg/kg		1.30E+01	NoA
561	1	2-Methylphenol	5.00E-01	mg/kg		1.54E+02	NoA
561	1	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
561	1	2-Nitrophenol	4.40E-01	mg/kg			NoC
561	1	3,3'-Dichlorobenzidine	2.10E+00	mg/kg		3.85E-01	Yes
561	1	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
561	1	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
561	1	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
561	1	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
561	1	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
561	1	4-Nitrophenol	2.10E+00	mg/kg			NoC
561	1	Acenaphthene	4.40E-01	mg/kg		1.17E+02	NoA
561	1	Acenaphthylene	4.40E-01	mg/kg			NoC
561	1	Anthracene	4.40E-01	mg/kg		7.47E+02	NoA
561	1	Benzene	5.00E-03	mg/kg		3.33E-01	NoA
561	1	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
561	1	Benzo(ghi)perylene	4.40E-01	mg/kg			NoC
561	1	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
561	1	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
561	1	Bis(2-chloroethyl) ether	4.40E-01	mg/kg		2.14E-01	Yes
561	1	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA
561	1	Bis(2-ethylhexyl)phthalate	4.40E-01	mg/kg		1.25E+01	NoA
561	1	Bromodichloromethane	5.00E-03	mg/kg		2.73E-01	NoA
561	1	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
561	1	Cadmium	1.83E+00	mg/kg	2.10E-01	8.11E-01	Yes
561	1	Carbon tetrachloride	5.00E-03	mg/kg		2.39E-01	NoA
561	1	Chloroform	5.00E-03	mg/kg		1.22E-01	NoA
561	1	cis-1,2-Dichloroethene	5.00E-03	mg/kg		1.05E+00	NoA
561	1	Dibenzofuran	4.40E-01	mg/kg		3.26E+00	NoA
561	1	Diethyl phthalate	4.40E-01	mg/kg		2.61E+03	NoA
561	1	Dimethyl phthalate	4.40E-01	mg/kg			NoC
561	1	Di-n-butyl phthalate	4.40E-01	mg/kg		3.26E+02	NoA
561	1	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA
561	1	Ethylbenzene	5.00E-03	mg/kg		1.58E+00	NoA
561	1	Fluoranthene	4.40E-01	mg/kg		1.09E+02	NoA
561	1	Fluorene	4.40E-01	mg/kg		9.15E+01	NoA
561	1	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
561	1	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
561	1	Hexachlorocyclopentadiene	2.10E+00	mg/kg		1.95E+01	NoA
561	1	Hexachloroethane	5.00E-01	mg/kg		2.28E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
561	1	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
561	1	Lead	1.83E+01	mg/kg	3.60E+01	4.00E+02	NoAB
561	1	m,p-Cresol	8.80E-01	mg/kg		3.91E+01	NoA
561	1	m,p-Xylene	1.00E-02	mg/kg		7.96E+00	NoA
561	1	Mercury	8.80E-02	mg/kg	2.00E-01	2.13E-01	NoAB
561	1	Methylene chloride	1.50E-02	mg/kg		3.65E+00	NoA
561	1	Molybdenum	4.80E+00	mg/kg		2.30E+01	NoA
561	1	Naphthalene	4.40E-01	mg/kg		1.15E+00	NoA
561	1	Nitrobenzene	2.10E+00	mg/kg		4.79E+00	NoA
561	1	N-Nitroso-di-n-propylamine	4.40E-01	mg/kg		1.89E-02	Yes
561	1	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
561	1	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
561	1	Phenanthrene	4.40E-01	mg/kg			NoC
561	1	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
561	1	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
561	1	Pyrene	4.40E-01	mg/kg		8.12E+01	NoA
561	1	Pyridine	8.80E-01	mg/kg		7.82E+00	NoA
561	1	Selenium	1.83E+01	mg/kg	8.00E-01	2.30E+01	NoA
561	1	Silver	1.20E+00	mg/kg	2.30E+00	2.61E+00	NoAB
561	1	Sodium	9.16E+01	mg/kg	3.20E+02		NoBE
561	1	Tetrachloroethene	5.00E-03	mg/kg		1.13E-01	NoA
561	1	Toluene	5.00E-03	mg/kg		9.61E+01	NoA
561	1	trans-1,2-Dichloroethene	5.00E-03	mg/kg		2.43E+00	NoA
561	1	Trichloroethene	5.00E-03	mg/kg		2.34E-02	NoA
561	1	Vinyl chloride	5.00E-03	mg/kg		8.24E-02	NoA
561	2	1,1,1,2-Tetrachloroethane	5.90E-03	mg/kg		1.86E+00	NoA
561	2	1,1,1-Trichloroethane	5.90E-03	mg/kg		1.46E+02	NoA
561	2	1,1,2,2-Tetrachloroethane	5.90E-03	mg/kg		5.62E-01	NoA
561	2	1,1,2-Trichloroethane	5.90E-03	mg/kg		2.30E-02	NoA
561	2	1,1-Dichloroethane	5.90E-03	mg/kg		1.34E+00	NoA
561	2	1,1-Dichloroethene	5.90E-03	mg/kg		2.37E-02	NoA
561	2	1,2,3-Trichloropropane	5.90E-03	mg/kg		4.97E-03	Yes
561	2	1,2,4-Trichlorobenzene	4.40E-01	mg/kg		7.86E-01	NoA
561	2	1,2-Dibromoethane	5.90E-03	mg/kg		3.37E-02	NoA
561	2	1,2-Dichlorobenzene	4.40E-01	mg/kg		2.92E+01	NoA
561	2	1,2-Dichloroethane	5.90E-03	mg/kg		1.55E-01	NoA
561	2	1,2-Dichloropropane	5.90E-03	mg/kg		9.40E-01	NoA
561	2	1,2-Dimethylbenzene	5.90E-03	mg/kg		5.35E+01	NoA
561	2	1,3-Dichlorobenzene	4.40E-01	mg/kg			NoC
561	2	1,4-Dichlorobenzene	4.90E-01	mg/kg		8.13E-01	NoA
561	2	2,4,5-Trichlorophenol	4.90E-01	mg/kg		3.26E+02	NoA
561	2	2,4,6-Trichlorophenol	4.90E-01	mg/kg		3.26E+00	NoA
561	2	2,4-Dichlorophenol	4.40E-01	mg/kg		9.78E+00	NoA
561	2	2,4-Dimethylphenol	4.40E-01	mg/kg		6.52E+01	NoA
561	2	2,4-Dinitrophenol	2.20E+00	mg/kg		6.52E+00	NoA
561	2	2,4-Dinitrotoluene	4.90E-01	mg/kg		5.63E-01	NoA
561	2	2,6-Dinitrotoluene	4.40E-01	mg/kg		3.26E+00	NoA
561	2	2-Butanone	2.30E-02	mg/kg		5.78E+02	NoA
561	2	2-Chloronaphthalene	4.40E-01	mg/kg		6.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
561	2	2-Chlorophenol	4.40E-01	mg/kg		3.91E+01	NoA
561	2	2-Hexanone	2.30E-02	mg/kg		4.05E+00	NoA
561	2	2-Methyl-4,6-dinitrophenol	2.20E+00	mg/kg		2.61E-01	Yes
561	2	2-Methylnaphthalene	4.90E-01	mg/kg		1.30E+01	NoA
561	2	2-Methylphenol	4.90E-01	mg/kg		1.54E+02	NoA
561	2	2-Nitrobenzenamine	2.20E+00	mg/kg		2.96E-01	Yes
561	2	2-Nitrophenol	4.40E-01	mg/kg			NoC
561	2	3,3'-Dichlorobenzidine	2.20E+00	mg/kg		3.85E-01	Yes
561	2	3-Nitrobenzenamine	2.20E+00	mg/kg		9.78E-01	Yes
561	2	4-Bromophenyl phenyl ether	4.40E-01	mg/kg			NoC
561	2	4-Chloro-3-methylphenol	4.40E-01	mg/kg			NoC
561	2	4-Chlorobenzenamine	4.40E-01	mg/kg		8.66E-01	NoA
561	2	4-Chlorophenyl phenyl ether	4.40E-01	mg/kg			NoC
561	2	4-Methyl-2-pentanone	2.30E-02	mg/kg		1.13E+02	NoA
561	2	4-Nitrophenol	2.20E+00	mg/kg			NoC
561	2	Acenaphthene	4.90E-01	mg/kg		1.17E+02	NoA
561	2	Acenaphthylene	4.40E-01	mg/kg			NoC
561	2	Acetone	1.80E-02	mg/kg		1.34E+03	NoA
561	2	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
561	2	Benzene	5.90E-03	mg/kg		3.33E-01	NoA
561	2	Benzenemethanol	4.40E-01	mg/kg		3.26E+02	NoA
561	2	Benzo(ghi)perylene	4.40E-01	mg/kg			NoC
561	2	Benzoic acid	2.20E+00	mg/kg		1.30E+04	NoA
561	2	Bis(2-chloroethoxy)methane	4.40E-01	mg/kg		9.78E+00	NoA
561	2	Bis(2-chloroethyl) ether	4.40E-01	mg/kg		2.14E-01	Yes
561	2	Bis(2-chloroisopropyl) ether	4.40E-01	mg/kg		4.57E+00	NoA
561	2	Bis(2-ethylhexyl)phthalate	4.40E-01	mg/kg		1.25E+01	NoA
561	2	Boron	4.68E+01	mg/kg		9.18E+02	NoA
561	2	Bromodichloromethane	5.90E-03	mg/kg		2.73E-01	NoA
561	2	Bromoform	5.90E-03	mg/kg		2.19E+01	NoA
561	2	Bromomethane	1.20E-02	mg/kg		1.34E-01	NoA
561	2	Butyl benzyl phthalate	4.40E-01	mg/kg		9.18E+01	NoA
561	2	Carbazole	4.90E-01	mg/kg		8.72E+00	NoA
561	2	Carbon disulfide	5.90E-03	mg/kg		1.48E+01	NoA
561	2	Carbon tetrachloride	5.90E-03	mg/kg		2.39E-01	NoA
561	2	Chlorobenzene	5.90E-03	mg/kg		4.07E+00	NoA
561	2	Chloroethane	1.20E-02	mg/kg		1.45E+03	NoA
561	2	Chloroform	5.90E-03	mg/kg		1.22E-01	NoA
561	2	Chloromethane	1.20E-02	mg/kg		1.65E+00	NoA
561	2	cis-1,2-Dichloroethene	5.90E-03	mg/kg		1.05E+00	NoA
561	2	cis-1,3-Dichloropropene	5.90E-03	mg/kg			NoC
561	2	Dibenzofuran	4.90E-01	mg/kg		3.26E+00	NoA
561	2	Dibromochloromethane	5.90E-03	mg/kg		2.42E-01	NoA
561	2	Dibromomethane	5.90E-03	mg/kg		2.46E+00	NoA
561	2	Dichlorodifluoromethane	1.20E-02	mg/kg		9.38E+00	NoA
561	2	Diethyl phthalate	4.90E-01	mg/kg		2.61E+03	NoA
561	2	Dimethyl phthalate	4.40E-01	mg/kg			NoC
561	2	Di-n-butyl phthalate	1.40E+00	mg/kg		3.26E+02	NoA
561	2	Di-n-octylphthalate	4.40E-01	mg/kg		1.30E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
561	2	Ethyl methacrylate	5.90E-03	mg/kg		1.52E+02	NoA
561	2	Ethylbenzene	5.90E-03	mg/kg		1.58E+00	NoA
561	2	Fluoranthene	4.60E-01	mg/kg		1.09E+02	NoA
561	2	Fluorene	4.90E-01	mg/kg		9.15E+01	NoA
561	2	Hexachlorobenzene	4.90E-01	mg/kg		4.92E-02	Yes
561	2	Hexachlorobutadiene	4.90E-01	mg/kg		2.22E+00	NoA
561	2	Hexachlorocyclopentadiene	2.20E+00	mg/kg		1.95E+01	NoA
561	2	Hexachloroethane	4.90E-01	mg/kg		2.28E+00	NoA
561	2	Iodomethane	5.90E-03	mg/kg			NoC
561	2	Isophorone	4.40E-01	mg/kg		1.82E+02	NoA
561	2	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
561	2	m,p-Cresol	8.90E-01	mg/kg		3.91E+01	NoA
561	2	m,p-Xylene	1.00E-02	mg/kg		7.96E+00	NoA
561	2	Mercury	9.70E-02	mg/kg	2.00E-01	2.13E-01	NoAB
561	2	Methylene chloride	1.60E-02	mg/kg		3.65E+00	NoA
561	2	Molybdenum	9.40E+00	mg/kg		2.30E+01	NoA
561	2	Naphthalene	4.90E-01	mg/kg		1.15E+00	NoA
561	2	Nitrobenzene	2.20E+00	mg/kg		4.79E+00	NoA
561	2	N-Nitroso-di-n-propylamine	4.40E-01	mg/kg		1.89E-02	Yes
561	2	N-Nitrosodiphenylamine	4.40E-01	mg/kg		3.22E+01	NoA
561	2	Pentachlorophenol	2.20E+00	mg/kg		4.36E-01	Yes
561	2	Phenanthrene	4.40E-01	mg/kg			NoC
561	2	Phenol	4.40E-01	mg/kg		4.98E+02	NoA
561	2	p-Nitroaniline	2.20E+00	mg/kg		8.66E+00	NoA
561	2	Pyrene	4.60E-01	mg/kg		8.12E+01	NoA
561	2	Pyridine	8.90E-01	mg/kg		7.82E+00	NoA
561	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
561	2	Silver	2.30E+00	mg/kg	2.30E+00	2.61E+00	NoA
561	2	Sodium	9.98E+01	mg/kg	3.20E+02		NoBE
561	2	Styrene	5.90E-03	mg/kg		9.43E+01	NoA
561	2	Tetrachloroethene	5.90E-03	mg/kg		1.13E-01	NoA
561	2	Toluene	5.00E-03	mg/kg		9.61E+01	NoA
561	2	trans-1,2-Dichloroethene	5.90E-03	mg/kg		2.43E+00	NoA
561	2	trans-1,3-Dichloropropene	5.90E-03	mg/kg			NoC
561	2	Trans-1,4-Dichloro-2-butene	1.20E-02	mg/kg		6.94E-03	Yes
561	2	Trichloroethene	5.90E-03	mg/kg		2.34E-02	NoA
561	2	Trichlorofluoromethane	5.90E-03	mg/kg		7.87E+01	NoA
561	2	Vinyl acetate	5.90E-03	mg/kg		1.83E+01	NoA
561	2	Vinyl chloride	5.90E-03	mg/kg		8.24E-02	NoA
562	1	Acenaphthene	4.90E-01	mg/kg		1.17E+02	NoA
562	1	Acenaphthylene	4.90E-01	mg/kg			NoC
562	1	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
562	1	Antimony	8.20E+00	mg/kg	2.10E-01	5.52E-01	Yes
562	1	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
562	1	Beryllium	4.88E-01	mg/kg	6.70E-01	5.67E-03	NoB
562	1	Cadmium	4.88E-01	mg/kg	2.10E-01	8.11E-01	NoA
562	1	Chromium	6.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
562	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
562	1	Fluorene	4.90E-01	mg/kg		9.15E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
562	1	Lead	8.00E+00	mg/kg	3.60E+01	4.00E+02	NoAB
562	1	Mercury	1.70E-02	mg/kg	2.00E-01	2.13E-01	NoAB
562	1	Molybdenum	4.88E+00	mg/kg		2.30E+01	NoA
562	1	Naphthalene	4.90E-01	mg/kg		1.15E+00	NoA
562	1	Nickel	4.88E+00	mg/kg	2.10E+01	1.04E+01	NoAB
562	1	PCB, Total	1.00E+00	mg/kg		6.48E-02	Yes
562	1	Phenanthrene	4.90E-01	mg/kg			NoC
562	1	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
562	1	Selenium	9.76E-01	mg/kg	8.00E-01	2.30E+01	NoA
562	1	Silver	2.05E+00	mg/kg	2.30E+00	2.61E+00	NoAB
562	1	Sodium	1.95E+02	mg/kg	3.20E+02		NoBE
562	1	Thallium	1.95E+00	mg/kg	2.10E-01	3.68E-01	Yes
562	1	Total PAH	4.90E-01	mg/kg		1.97E-02	Yes
562	1	Zinc	1.95E+01	mg/kg	6.50E+01	1.38E+03	NoAB
562	2	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
562	2	Acenaphthylene	5.00E-01	mg/kg			NoC
562	2	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
562	2	Antimony	8.30E+00	mg/kg	2.10E-01	5.52E-01	Yes
562	2	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
562	2	Beryllium	4.82E-01	mg/kg	6.70E-01	5.67E-03	NoB
562	2	Cadmium	4.82E-01	mg/kg	2.10E-01	8.11E-01	NoA
562	2	Chromium	6.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
562	2	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
562	2	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
562	2	Molybdenum	4.82E+00	mg/kg		2.30E+01	NoA
562	2	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
562	2	Nickel	4.82E+00	mg/kg	2.10E+01	1.04E+01	NoAB
562	2	Phenanthrene	5.00E-01	mg/kg			NoC
562	2	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
562	2	Selenium	9.65E-01	mg/kg	8.00E-01	2.30E+01	NoA
562	2	Silver	2.08E+00	mg/kg	2.30E+00	2.61E+00	NoAB
562	2	Sodium	1.93E+02	mg/kg	3.20E+02		NoBE
562	2	Thallium	1.93E+00	mg/kg	2.10E-01	3.68E-01	Yes
562	2	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
562	2	Uranium	8.00E+00	mg/kg	4.90E+00	1.38E+01	NoA
562	3	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
562	3	Acenaphthylene	5.00E-01	mg/kg			NoC
562	3	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
562	3	Antimony	7.72E+00	mg/kg	2.10E-01	5.52E-01	Yes
562	3	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
562	3	Beryllium	4.46E-01	mg/kg	6.70E-01	5.67E-03	NoB
562	3	Cadmium	4.46E-01	mg/kg	2.10E-01	8.11E-01	NoA
562	3	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
562	3	Mercury	1.50E-02	mg/kg	2.00E-01	2.13E-01	NoAB
562	3	Molybdenum	4.46E+00	mg/kg		2.30E+01	NoA
562	3	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
562	3	Selenium	8.93E-01	mg/kg	8.00E-01	2.30E+01	NoA
562	3	Silver	1.93E+00	mg/kg	2.30E+00	2.61E+00	NoAB
562	3	Sodium	1.79E+02	mg/kg	3.20E+02		NoBE

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
562	3	Thallium	1.79E+00	mg/kg	2.10E-01	3.68E-01	Yes
562	4	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
562	4	Acenaphthylene	5.00E-01	mg/kg			NoC
562	4	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
562	4	Antimony	8.13E+00	mg/kg	2.10E-01	5.52E-01	Yes
562	4	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
562	4	Beryllium	4.83E-01	mg/kg	6.70E-01	5.67E-03	NoB
562	4	Cadmium	4.83E-01	mg/kg	2.10E-01	8.11E-01	NoA
562	4	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
562	4	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
562	4	Molybdenum	4.83E+00	mg/kg		2.30E+01	NoA
562	4	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
562	4	PCB, Total	1.00E+00	mg/kg		6.48E-02	Yes
562	4	Phenanthrene	5.00E-01	mg/kg			NoC
562	4	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
562	4	Selenium	9.67E-01	mg/kg	8.00E-01	2.30E+01	NoA
562	4	Silver	2.03E+00	mg/kg	2.30E+00	2.61E+00	NoAB
562	4	Sodium	1.93E+02	mg/kg	3.20E+02		NoBE
562	4	Thallium	1.93E+00	mg/kg	2.10E-01	3.68E-01	Yes
562	4	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
562	5	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
562	5	Acenaphthylene	5.00E-01	mg/kg			NoC
562	5	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
562	5	Antimony	9.53E+00	mg/kg	2.10E-01	5.52E-01	Yes
562	5	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
562	5	Beryllium	4.93E-01	mg/kg	6.70E-01	5.67E-03	NoB
562	5	Cadmium	4.93E-01	mg/kg	2.10E-01	8.11E-01	NoA
562	5	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
562	5	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
562	5	Lead	8.00E+00	mg/kg	3.60E+01	4.00E+02	NoAB
562	5	Molybdenum	4.93E+00	mg/kg		2.30E+01	NoA
562	5	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
562	5	Phenanthrene	4.90E-01	mg/kg			NoC
562	5	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
562	5	Selenium	9.86E-01	mg/kg	8.00E-01	2.30E+01	NoA
562	5	Silver	2.38E+00	mg/kg	2.30E+00	2.61E+00	NoA
562	5	Sodium	1.97E+02	mg/kg	3.20E+02		NoBE
562	5	Thallium	1.97E+00	mg/kg	2.10E-01	3.68E-01	Yes
563	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
563	1	Acenaphthylene	5.00E-01	mg/kg			NoC
563	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
563	1	Antimony	8.26E+00	mg/kg	2.10E-01	5.52E-01	Yes
563	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
563	1	Beryllium	4.90E-01	mg/kg	6.70E-01	5.67E-03	NoB
563	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
563	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
563	1	Molybdenum	4.90E+00	mg/kg		2.30E+01	NoA
563	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
563	1	Phenanthrene	5.00E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
563	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
563	1	Selenium	9.79E-01	mg/kg	8.00E-01	2.30E+01	NoA
563	1	Silver	2.06E+00	mg/kg	2.30E+00	2.61E+00	NoAB
563	1	Sodium	1.96E+02	mg/kg	3.20E+02		NoBE
563	1	Thallium	1.96E+00	mg/kg	2.10E-01	3.68E-01	Yes
563	1	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
563	2	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
563	2	Acenaphthylene	5.00E-01	mg/kg			NoC
563	2	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
563	2	Antimony	7.85E+00	mg/kg	2.10E-01	5.52E-01	Yes
563	2	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
563	2	Beryllium	4.68E-01	mg/kg	6.70E-01	5.67E-03	NoB
563	2	Cadmium	4.68E-01	mg/kg	2.10E-01	8.11E-01	NoA
563	2	Chromium	6.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
563	2	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
563	2	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
563	2	Molybdenum	4.68E+00	mg/kg		2.30E+01	NoA
563	2	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
563	2	PCB, Total	1.00E+00	mg/kg		6.48E-02	Yes
563	2	Phenanthrene	5.00E-01	mg/kg			NoC
563	2	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
563	2	Selenium	9.36E-01	mg/kg	8.00E-01	2.30E+01	NoA
563	2	Silver	1.96E+00	mg/kg	2.30E+00	2.61E+00	NoAB
563	2	Sodium	1.87E+02	mg/kg	3.20E+02		NoBE
563	2	Thallium	1.87E+00	mg/kg	2.10E-01	3.68E-01	Yes
563	2	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
563	2	Uranium	8.00E+00	mg/kg	4.90E+00	1.38E+01	NoA
564	1	Acenaphthene	4.90E-01	mg/kg		1.17E+02	NoA
564	1	Acenaphthylene	4.90E-01	mg/kg			NoC
564	1	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
564	1	Antimony	8.83E+00	mg/kg	2.10E-01	5.52E-01	Yes
564	1	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
564	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
564	1	Fluorene	4.90E-01	mg/kg		9.15E+01	NoA
564	1	Naphthalene	4.90E-01	mg/kg		1.15E+00	NoA
564	1	Phenanthrene	4.90E-01	mg/kg			NoC
564	1	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
564	1	Silver	2.21E+00	mg/kg	2.30E+00	2.61E+00	NoAB
564	1	Sodium	1.95E+02	mg/kg	3.20E+02		NoBE
564	1	Total PAH	4.90E-01	mg/kg		1.97E-02	Yes
567	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
567	1	Acenaphthylene	5.00E-01	mg/kg			NoC
567	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
567	1	Antimony	7.91E+00	mg/kg	2.10E-01	5.52E-01	Yes
567	1	Arsenic	4.44E+00	mg/kg	1.20E+01	2.38E-01	NoB
567	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
567	1	Beryllium	4.69E-01	mg/kg	6.70E-01	5.67E-03	NoB
567	1	Cadmium	2.35E+00	mg/kg	2.10E-01	8.11E-01	Yes
567	1	Copper	1.17E+01	mg/kg	1.90E+01	1.84E+02	NoAB

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
567	1	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
567	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
567	1	Molybdenum	4.69E+00	mg/kg		2.30E+01	NoA
567	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
567	1	PCB, Total	1.30E-01	mg/kg		6.48E-02	Yes
567	1	Phenanthrene	5.00E-01	mg/kg			NoC
567	1	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
567	1	Selenium	4.69E+00	mg/kg	8.00E-01	2.30E+01	NoA
567	1	Silver	1.98E+00	mg/kg	2.30E+00	2.61E+00	NoAB
567	1	Sodium	1.88E+02	mg/kg	3.20E+02		NoBE
567	1	Thallium	9.38E+00	mg/kg	2.10E-01	3.68E-01	Yes
567	1	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
567	1	Uranium	4.69E+00	mg/kg	4.90E+00	1.38E+01	NoAB
567	2	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
567	2	1,1-Dichloroethene	4.00E-02	mg/kg		2.37E-02	Yes
567	2	Tetrachloroethene	5.00E-03	mg/kg		1.13E-01	NoA
567	2	Trichloroethene	5.00E-03	mg/kg		2.34E-02	NoA
567	3	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
567	3	Acenaphthylene	5.00E-01	mg/kg			NoC
567	3	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
567	3	Antimony	8.14E+00	mg/kg	2.10E-01	5.52E-01	Yes
567	3	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
567	3	Cadmium	2.27E+00	mg/kg	2.10E-01	8.11E-01	Yes
567	3	Copper	1.14E+01	mg/kg	1.90E+01	1.84E+02	NoAB
567	3	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
567	3	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
567	3	Molybdenum	4.54E+00	mg/kg		2.30E+01	NoA
567	3	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
567	3	PCB, Total	1.30E-01	mg/kg		6.48E-02	Yes
567	3	Phenanthrene	5.00E-01	mg/kg			NoC
567	3	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
567	3	Selenium	4.54E+00	mg/kg	8.00E-01	2.30E+01	NoA
567	3	Silver	2.04E+00	mg/kg	2.30E+00	2.61E+00	NoAB
567	3	Sodium	1.82E+02	mg/kg	3.20E+02		NoBE
567	3	Thallium	9.08E+00	mg/kg	2.10E-01	3.68E-01	Yes
567	3	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
567	3	Uranium	4.54E+00	mg/kg	4.90E+00	1.38E+01	NoAB
567	4	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
567	4	Acenaphthylene	5.00E-01	mg/kg			NoC
567	4	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
567	4	Antimony	8.18E+00	mg/kg	2.10E-01	5.52E-01	Yes
567	4	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
567	4	Beryllium	4.96E-01	mg/kg	6.70E-01	5.67E-03	NoB
567	4	Cadmium	2.48E+00	mg/kg	2.10E-01	8.11E-01	Yes
567	4	Copper	1.24E+01	mg/kg	1.90E+01	1.84E+02	NoAB
567	4	Fluoranthene	5.00E-01	mg/kg		1.09E+02	NoA
567	4	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
567	4	Molybdenum	4.96E+00	mg/kg		2.30E+01	NoA
567	4	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
567	4	PCB, Total	1.30E-01	mg/kg		6.48E-02	Yes
567	4	Phenanthrene	5.00E-01	mg/kg			NoC
567	4	Pyrene	5.00E-01	mg/kg		8.12E+01	NoA
567	4	Selenium	4.96E+00	mg/kg	8.00E-01	2.30E+01	NoA
567	4	Silver	2.05E+00	mg/kg	2.30E+00	2.61E+00	NoAB
567	4	Sodium	1.99E+02	mg/kg	3.20E+02		NoBE
567	4	Thallium	9.93E+00	mg/kg	2.10E-01	3.68E-01	Yes
567	4	Total PAH	5.00E-01	mg/kg		1.97E-02	Yes
567	4	Uranium	4.96E+00	mg/kg	4.90E+00	1.38E+01	NoA
14	1	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
14	1	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
14	1	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
14	1	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
14	1	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
14	1	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
14	1	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
14	1	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
14	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	1	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
14	1	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
14	1	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
14	1	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
14	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	1	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
14	1	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
14	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
14	1	2-Nitrophenol	3.40E-01	mg/kg			NoC
14	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	1	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
14	1	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
14	1	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
14	1	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
14	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	1	Acenaphthene	3.40E-01	mg/kg		1.17E+02	NoA
14	1	Acenaphthylene	3.40E-01	mg/kg			NoC
14	1	Anthracene	3.40E-01	mg/kg		7.47E+02	NoA
14	1	Antimony	5.20E-01	mg/kg	2.10E-01	5.52E-01	NoA
14	1	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
14	1	Benzo(ghi)perylene	3.40E-01	mg/kg			NoC
14	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	1	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
14	1	Bis(2-chloroethyl) ether	6.80E-03	mg/kg		2.14E-01	NoA
14	1	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
14	1	Bis(2-ethylhexyl)phthalate	3.40E-01	mg/kg		1.25E+01	NoA
14	1	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
14	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
14	1	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
14	1	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	1	Dimethyl phthalate	3.40E-01	mg/kg			NoC
14	1	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
14	1	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
14	1	Fluoranthene	3.40E-01	mg/kg		1.09E+02	NoA
14	1	Fluorene	3.40E-01	mg/kg		9.15E+01	NoA
14	1	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
14	1	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
14	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
14	1	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
14	1	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
14	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
14	1	m,p-Cresol	6.80E-01	mg/kg		3.91E+01	NoA
14	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
14	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	1	Naphthalene	3.40E-01	mg/kg		1.15E+00	NoA
14	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	1	N-Nitroso-di-n-propylamine	6.80E-03	mg/kg		1.89E-02	NoA
14	1	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
14	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
14	1	Phenanthrene	3.40E-01	mg/kg			NoC
14	1	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
14	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	1	Pyrene	3.40E-01	mg/kg		8.12E+01	NoA
14	1	Pyridine	6.80E-01	mg/kg		7.82E+00	NoA
14	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	1	Total PAH	6.80E-03	mg/kg		1.97E-02	NoA
14	2	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
14	2	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
14	2	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
14	2	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
14	2	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
14	2	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
14	2	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
14	2	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
14	2	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	2	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
14	2	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
14	2	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
14	2	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
14	2	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	2	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
14	2	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
14	2	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
14	2	2-Nitrophenol	3.40E-01	mg/kg			NoC
14	2	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	2	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	2	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
14	2	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
14	2	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	2	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
14	2	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	2	Acenaphthylene	3.40E-01	mg/kg			NoC
14	2	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
14	2	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	2	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
14	2	Bis(2-chloroethyl) ether	6.80E-03	mg/kg		2.14E-01	NoA
14	2	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
14	2	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
14	2	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
14	2	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
14	2	Dimethyl phthalate	3.40E-01	mg/kg			NoC
14	2	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
14	2	Fluorene	3.40E-01	mg/kg		9.15E+01	NoA
14	2	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
14	2	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
14	2	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
14	2	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
14	2	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
14	2	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
14	2	m,p-Cresol	6.80E-01	mg/kg		3.91E+01	NoA
14	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	2	Naphthalene	3.40E-01	mg/kg		1.15E+00	NoA
14	2	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	2	N-Nitroso-di-n-propylamine	6.80E-03	mg/kg		1.89E-02	NoA
14	2	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
14	2	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
14	2	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
14	2	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	2	Pyridine	6.80E-01	mg/kg		7.82E+00	NoA
14	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	2	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
14	3	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
14	3	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
14	3	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
14	3	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
14	3	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
14	3	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
14	3	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
14	3	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
14	3	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	3	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
14	3	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
14	3	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
14	3	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
14	3	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	3	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
14	3	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
14	3	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	3	2-Nitrophenol	3.40E-01	mg/kg			NoC
14	3	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	3	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	3	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
14	3	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
14	3	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
14	3	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
14	3	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	3	Acenaphthene	3.40E-01	mg/kg		1.17E+02	NoA
14	3	Acenaphthylene	3.40E-01	mg/kg			NoC
14	3	Anthracene	3.40E-01	mg/kg		7.47E+02	NoA
14	3	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
14	3	Benzo(ghi)perylene	3.40E-01	mg/kg			NoC
14	3	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	3	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
14	3	Bis(2-chloroethyl) ether	6.80E-03	mg/kg		2.14E-01	NoA
14	3	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
14	3	Bis(2-ethylhexyl)phthalate	3.40E-01	mg/kg		1.25E+01	NoA
14	3	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
14	3	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
14	3	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
14	3	Dimethyl phthalate	3.40E-01	mg/kg			NoC
14	3	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
14	3	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
14	3	Fluoranthene	3.40E-01	mg/kg		1.09E+02	NoA
14	3	Fluorene	3.40E-01	mg/kg		9.15E+01	NoA
14	3	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
14	3	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
14	3	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
14	3	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
14	3	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
14	3	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
14	3	m,p-Cresol	6.80E-01	mg/kg		3.91E+01	NoA
14	3	Naphthalene	3.40E-01	mg/kg		1.15E+00	NoA
14	3	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	3	N-Nitroso-di-n-propylamine	6.80E-03	mg/kg		1.89E-02	NoA
14	3	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
14	3	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
14	3	Phenanthrene	3.40E-01	mg/kg			NoC
14	3	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
14	3	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	3	Pyrene	3.40E-01	mg/kg		8.12E+01	NoA
14	3	Pyridine	6.80E-01	mg/kg		7.82E+00	NoA
14	3	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	3	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
14	3	Total PAH	6.80E-03	mg/kg		1.97E-02	NoA
14	4	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
14	4	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
14	4	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	4	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
14	4	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
14	4	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
14	4	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
14	4	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
14	4	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
14	4	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
14	4	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
14	4	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
14	4	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
14	4	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
14	4	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
14	4	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
14	4	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
14	4	2-Nitrophenol	3.70E-01	mg/kg			NoC
14	4	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
14	4	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
14	4	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
14	4	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
14	4	4-Chlorobenzeneamine	3.70E-01	mg/kg		8.66E-01	NoA
14	4	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
14	4	4-Nitrophenol	1.80E+00	mg/kg			NoC
14	4	Acenaphthene	3.70E-01	mg/kg		1.17E+02	NoA
14	4	Acenaphthylene	3.70E-01	mg/kg			NoC
14	4	Anthracene	3.70E-01	mg/kg		7.47E+02	NoA
14	4	Benzenemethanol	3.70E-01	mg/kg		3.26E+02	NoA
14	4	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
14	4	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
14	4	Bis(2-chloroethyl) ether	7.40E-03	mg/kg		2.14E-01	NoA
14	4	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
14	4	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
14	4	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
14	4	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
14	4	Dimethyl phthalate	3.70E-01	mg/kg			NoC
14	4	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
14	4	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
14	4	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
14	4	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
14	4	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
14	4	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
14	4	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
14	4	m,p-Cresol	7.40E-01	mg/kg		3.91E+01	NoA
14	4	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	4	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
14	4	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
14	4	N-Nitroso-di-n-propylamine	7.40E-03	mg/kg		1.89E-02	NoA
14	4	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
14	4	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
14	4	Phenol	3.70E-01	mg/kg		4.98E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	4	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
14	4	Pyridine	7.40E-01	mg/kg		7.82E+00	NoA
14	4	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	5	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
14	5	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
14	5	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
14	5	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
14	5	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
14	5	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
14	5	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
14	5	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
14	5	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
14	5	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
14	5	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
14	5	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
14	5	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
14	5	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
14	5	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
14	5	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
14	5	2-Nitrophenol	3.60E-01	mg/kg			NoC
14	5	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
14	5	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
14	5	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
14	5	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
14	5	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
14	5	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
14	5	4-Nitrophenol	1.80E+00	mg/kg			NoC
14	5	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
14	5	Acenaphthylene	3.60E-01	mg/kg			NoC
14	5	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
14	5	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
14	5	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
14	5	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
14	5	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
14	5	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
14	5	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
14	5	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
14	5	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
14	5	Dimethyl phthalate	3.60E-01	mg/kg			NoC
14	5	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
14	5	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
14	5	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
14	5	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
14	5	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
14	5	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
14	5	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
14	5	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
14	5	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
14	5	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	5	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	5	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
14	5	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
14	5	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
14	5	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
14	5	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
14	5	Phenanthrene	3.60E-01	mg/kg			NoC
14	5	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
14	5	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
14	5	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
14	5	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	5	Zinc	2.50E+01	mg/kg	6.50E+01	1.38E+03	NoAB
14	6	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
14	6	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
14	6	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
14	6	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
14	6	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
14	6	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
14	6	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
14	6	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
14	6	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	6	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
14	6	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
14	6	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
14	6	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
14	6	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	6	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
14	6	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
14	6	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
14	6	2-Nitrophenol	3.60E-01	mg/kg			NoC
14	6	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	6	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	6	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
14	6	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
14	6	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
14	6	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
14	6	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	6	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
14	6	Acenaphthylene	3.60E-01	mg/kg			NoC
14	6	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
14	6	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
14	6	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
14	6	Benzo(ghi)perylene	3.60E-01	mg/kg			NoC
14	6	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	6	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
14	6	Bis(2-chloroethyl) ether	7.20E-03	mg/kg		2.14E-01	NoA
14	6	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
14	6	Bis(2-ethylhexyl)phthalate	3.60E-01	mg/kg		1.25E+01	NoA
14	6	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	6	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
14	6	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
14	6	Dimethyl phthalate	3.60E-01	mg/kg			NoC
14	6	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
14	6	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
14	6	Fluoranthene	3.60E-01	mg/kg		1.09E+02	NoA
14	6	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
14	6	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
14	6	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
14	6	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
14	6	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
14	6	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
14	6	m,p-Cresol	7.20E-01	mg/kg		3.91E+01	NoA
14	6	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	6	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
14	6	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	6	N-Nitroso-di-n-propylamine	7.20E-03	mg/kg		1.89E-02	NoA
14	6	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
14	6	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
14	6	Phenanthrene	3.60E-01	mg/kg			NoC
14	6	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
14	6	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	6	Pyrene	3.60E-01	mg/kg		8.12E+01	NoA
14	6	Pyridine	7.20E-01	mg/kg		7.82E+00	NoA
14	6	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	7	1,2,4-Trichlorobenzene	4.00E-01	mg/kg		7.86E-01	NoA
14	7	1,2-Dichlorobenzene	4.00E-01	mg/kg		2.92E+01	NoA
14	7	1,3-Dichlorobenzene	4.00E-01	mg/kg			NoC
14	7	1,4-Dichlorobenzene	4.00E-01	mg/kg		8.13E-01	NoA
14	7	2,4,5-Trichlorophenol	4.00E-01	mg/kg		3.26E+02	NoA
14	7	2,4,6-Trichlorophenol	4.00E-01	mg/kg		3.26E+00	NoA
14	7	2,4-Dichlorophenol	4.00E-01	mg/kg		9.78E+00	NoA
14	7	2,4-Dimethylphenol	4.00E-01	mg/kg		6.52E+01	NoA
14	7	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
14	7	2,4-Dinitrotoluene	4.00E-01	mg/kg		5.63E-01	NoA
14	7	2,6-Dinitrotoluene	4.00E-01	mg/kg		3.26E+00	NoA
14	7	2-Chloronaphthalene	4.00E-01	mg/kg		6.26E+02	NoA
14	7	2-Chlorophenol	4.00E-01	mg/kg		3.91E+01	NoA
14	7	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
14	7	2-Methylnaphthalene	4.00E-01	mg/kg		1.30E+01	NoA
14	7	2-Methylphenol	4.00E-01	mg/kg		1.54E+02	NoA
14	7	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
14	7	2-Nitrophenol	4.00E-01	mg/kg			NoC
14	7	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
14	7	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
14	7	4-Bromophenyl phenyl ether	4.00E-01	mg/kg			NoC
14	7	4-Chloro-3-methylphenol	4.00E-01	mg/kg			NoC
14	7	4-Chlorobenzenamine	4.00E-01	mg/kg		8.66E-01	NoA
14	7	4-Chlorophenyl phenyl ether	4.00E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	7	4-Nitrophenol	1.90E+00	mg/kg			NoC
14	7	Acenaphthene	4.00E-01	mg/kg		1.17E+02	NoA
14	7	Acenaphthylene	4.00E-01	mg/kg			NoC
14	7	Benzenemethanol	4.00E-01	mg/kg		3.26E+02	NoA
14	7	Benzo(ghi)perylene	4.00E-01	mg/kg			NoC
14	7	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
14	7	Bis(2-chloroethoxy)methane	4.00E-01	mg/kg		9.78E+00	NoA
14	7	Bis(2-chloroethyl) ether	8.00E-03	mg/kg		2.14E-01	NoA
14	7	Bis(2-chloroisopropyl) ether	4.00E-01	mg/kg		4.57E+00	NoA
14	7	Bis(2-ethylhexyl)phthalate	4.00E-01	mg/kg		1.25E+01	NoA
14	7	Butyl benzyl phthalate	4.00E-01	mg/kg		9.18E+01	NoA
14	7	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
14	7	Dibenzofuran	4.00E-01	mg/kg		3.26E+00	NoA
14	7	Diethyl phthalate	4.00E-01	mg/kg		2.61E+03	NoA
14	7	Dimethyl phthalate	4.00E-01	mg/kg			NoC
14	7	Di-n-butyl phthalate	4.00E-01	mg/kg		3.26E+02	NoA
14	7	Di-n-octylphthalate	4.00E-01	mg/kg		1.30E+02	NoA
14	7	Fluorene	4.00E-01	mg/kg		9.15E+01	NoA
14	7	Hexachlorobenzene	4.00E-01	mg/kg		4.92E-02	Yes
14	7	Hexachlorobutadiene	4.00E-01	mg/kg		2.22E+00	NoA
14	7	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
14	7	Hexachloroethane	4.00E-01	mg/kg		2.28E+00	NoA
14	7	Isophorone	4.00E-01	mg/kg		1.82E+02	NoA
14	7	m,p-Cresol	8.00E-01	mg/kg		3.91E+01	NoA
14	7	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	7	Naphthalene	4.00E-01	mg/kg		1.15E+00	NoA
14	7	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
14	7	N-Nitroso-di-n-propylamine	8.00E-03	mg/kg		1.89E-02	NoA
14	7	N-Nitrosodiphenylamine	4.00E-01	mg/kg		3.22E+01	NoA
14	7	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
14	7	Phenanthrene	4.00E-01	mg/kg			NoC
14	7	Phenol	4.00E-01	mg/kg		4.98E+02	NoA
14	7	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
14	7	Pyridine	8.00E-01	mg/kg		7.82E+00	NoA
14	7	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	7	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
14	8	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
14	8	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
14	8	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
14	8	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
14	8	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
14	8	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
14	8	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
14	8	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
14	8	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	8	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
14	8	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
14	8	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
14	8	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	8	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	8	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
14	8	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
14	8	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
14	8	2-Nitrophenol	3.50E-01	mg/kg			NoC
14	8	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	8	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	8	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
14	8	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
14	8	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
14	8	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
14	8	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	8	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
14	8	Acenaphthylene	3.50E-01	mg/kg			NoC
14	8	Anthracene	3.50E-01	mg/kg		7.47E+02	NoA
14	8	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
14	8	Benzo(ghi)perylene	3.50E-01	mg/kg			NoC
14	8	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	8	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
14	8	Bis(2-chloroethyl) ether	7.00E-03	mg/kg		2.14E-01	NoA
14	8	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
14	8	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
14	8	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
14	8	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
14	8	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
14	8	Dimethyl phthalate	3.50E-01	mg/kg			NoC
14	8	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
14	8	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
14	8	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
14	8	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
14	8	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
14	8	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
14	8	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
14	8	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
14	8	m,p-Cresol	7.00E-01	mg/kg		3.91E+01	NoA
14	8	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	8	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
14	8	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	8	N-Nitroso-di-n-propylamine	7.00E-03	mg/kg		1.89E-02	NoA
14	8	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
14	8	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
14	8	Phenanthrene	3.50E-01	mg/kg			NoC
14	8	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
14	8	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	8	Pyridine	7.00E-01	mg/kg		7.82E+00	NoA
14	8	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	9	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
14	9	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
14	9	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	9	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
14	9	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
14	9	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
14	9	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
14	9	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
14	9	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	9	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
14	9	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
14	9	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
14	9	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
14	9	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	9	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
14	9	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
14	9	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
14	9	2-Nitrophenol	3.50E-01	mg/kg			NoC
14	9	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	9	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	9	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
14	9	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
14	9	4-Chlorobenzeneamine	3.50E-01	mg/kg		8.66E-01	NoA
14	9	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
14	9	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	9	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
14	9	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
14	9	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	9	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
14	9	Bis(2-chloroethyl) ether	7.10E-03	mg/kg		2.14E-01	NoA
14	9	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
14	9	Bis(2-ethylhexyl)phthalate	3.50E-01	mg/kg		1.25E+01	NoA
14	9	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
14	9	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
14	9	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
14	9	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
14	9	Dimethyl phthalate	3.50E-01	mg/kg			NoC
14	9	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
14	9	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
14	9	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
14	9	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
14	9	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
14	9	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
14	9	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
14	9	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
14	9	m,p-Cresol	7.10E-01	mg/kg		3.91E+01	NoA
14	9	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	9	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
14	9	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	9	N-Nitroso-di-n-propylamine	7.10E-03	mg/kg		1.89E-02	NoA
14	9	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
14	9	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	9	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
14	9	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	9	Pyridine	7.10E-01	mg/kg		7.82E+00	NoA
14	9	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	9	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
14	10	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
14	10	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
14	10	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
14	10	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
14	10	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
14	10	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
14	10	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
14	10	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
14	10	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
14	10	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
14	10	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
14	10	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
14	10	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
14	10	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
14	10	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
14	10	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
14	10	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
14	10	2-Nitrophenol	3.50E-01	mg/kg			NoC
14	10	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
14	10	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
14	10	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
14	10	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
14	10	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
14	10	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
14	10	4-Nitrophenol	1.70E+00	mg/kg			NoC
14	10	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
14	10	Acenaphthylene	3.50E-01	mg/kg			NoC
14	10	Anthracene	3.50E-01	mg/kg		7.47E+02	NoA
14	10	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
14	10	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
14	10	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
14	10	Bis(2-chloroethyl) ether	7.00E-03	mg/kg		2.14E-01	NoA
14	10	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
14	10	Bis(2-ethylhexyl)phthalate	3.50E-01	mg/kg		1.25E+01	NoA
14	10	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
14	10	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
14	10	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
14	10	Dimethyl phthalate	3.50E-01	mg/kg			NoC
14	10	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
14	10	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
14	10	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
14	10	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
14	10	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
14	10	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
14	10	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
14	10	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
14	10	m,p-Cresol	7.00E-01	mg/kg		3.91E+01	NoA
14	10	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
14	10	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
14	10	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
14	10	N-Nitroso-di-n-propylamine	7.00E-03	mg/kg		1.89E-02	NoA
14	10	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
14	10	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
14	10	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
14	10	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
14	10	Pyridine	7.00E-01	mg/kg		7.82E+00	NoA
14	10	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
14	10	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
518	1	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
518	1	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
518	1	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
518	1	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
518	1	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
518	1	1,2,4-Trichlorobenzene	2.40E+00	mg/kg		7.86E-01	Yes
518	1	1,2-Dichlorobenzene	2.40E+00	mg/kg		2.92E+01	NoA
518	1	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
518	1	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
518	1	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
518	1	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
518	1	1,3-Dichlorobenzene	2.40E+00	mg/kg			NoC
518	1	1,4-Dichlorobenzene	2.40E+00	mg/kg		8.13E-01	Yes
518	1	2,4,5-Trichlorophenol	2.40E+00	mg/kg		3.26E+02	NoA
518	1	2,4,6-Trichlorophenol	2.40E+00	mg/kg		3.26E+00	NoA
518	1	2,4-Dichlorophenol	2.40E+00	mg/kg		9.78E+00	NoA
518	1	2,4-Dimethylphenol	2.40E+00	mg/kg		6.52E+01	NoA
518	1	2,4-Dinitrophenol	2.40E+00	mg/kg		6.52E+00	NoA
518	1	2,4-Dinitrotoluene	2.40E+00	mg/kg		5.63E-01	Yes
518	1	2,6-Dinitrotoluene	2.40E+00	mg/kg		3.26E+00	NoA
518	1	2-Butanone	1.20E-02	mg/kg		5.78E+02	NoA
518	1	2-Chloronaphthalene	2.40E+00	mg/kg		6.26E+02	NoA
518	1	2-Chlorophenol	2.40E+00	mg/kg		3.91E+01	NoA
518	1	2-Hexanone	1.20E-02	mg/kg		4.05E+00	NoA
518	1	2-Methyl-4,6-dinitrophenol	2.40E+00	mg/kg		2.61E-01	Yes
518	1	2-Methylnaphthalene	2.40E+00	mg/kg		1.30E+01	NoA
518	1	2-Methylphenol	2.40E+00	mg/kg		1.54E+02	NoA
518	1	2-Nitrobenzenamine	2.40E+00	mg/kg		2.96E-01	Yes
518	1	2-Nitrophenol	2.40E+00	mg/kg			NoC
518	1	3,3'-Dichlorobenzidine	2.40E+00	mg/kg		3.85E-01	Yes
518	1	3-Nitrobenzenamine	2.40E+00	mg/kg		9.78E-01	Yes
518	1	4-Bromophenyl phenyl ether	2.40E+00	mg/kg			NoC
518	1	4-Chloro-3-methylphenol	2.40E+00	mg/kg			NoC
518	1	4-Chlorobenzenamine	2.40E+00	mg/kg		8.66E-01	Yes
518	1	4-Chlorophenyl phenyl ether	2.40E+00	mg/kg			NoC

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
518	1	4-Methyl-2-pentanone	1.20E-02	mg/kg		1.13E+02	NoA
518	1	4-Nitrophenol	2.40E+00	mg/kg			NoC
518	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
518	1	Acenaphthylene	2.40E+00	mg/kg			NoC
518	1	Acetone	1.90E-02	mg/kg		1.34E+03	NoA
518	1	Anthracene	5.00E-01	mg/kg		7.47E+02	NoA
518	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
518	1	Arsenic	5.00E+00	mg/kg	1.20E+01	2.38E-01	NoB
518	1	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
518	1	Benzenemethanol	3.90E-01	mg/kg		3.26E+02	NoA
518	1	Benzo(ghi)perylene	5.00E-01	mg/kg			NoC
518	1	Benzoic acid	2.00E+00	mg/kg		1.30E+04	NoA
518	1	Beryllium	5.00E-01	mg/kg	6.70E-01	5.67E-03	NoB
518	1	Bis(2-chloroethoxy)methane	2.40E+00	mg/kg		9.78E+00	NoA
518	1	Bis(2-chloroethyl) ether	2.40E+00	mg/kg		2.14E-01	Yes
518	1	Bis(2-chloroisopropyl) ether	2.40E+00	mg/kg		4.57E+00	NoA
518	1	Bis(2-ethylhexyl)phthalate	5.00E-01	mg/kg		1.25E+01	NoA
518	1	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
518	1	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
518	1	Bromomethane	1.20E-02	mg/kg		1.34E-01	NoA
518	1	Butyl benzyl phthalate	2.40E+00	mg/kg		9.18E+01	NoA
518	1	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
518	1	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
518	1	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
518	1	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
518	1	Chloroethane	1.20E-02	mg/kg		1.45E+03	NoA
518	1	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
518	1	Chloromethane	1.20E-02	mg/kg		1.65E+00	NoA
518	1	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
518	1	Dibenzofuran	3.90E-01	mg/kg		3.26E+00	NoA
518	1	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA
518	1	Diethyl phthalate	5.00E-01	mg/kg		2.61E+03	NoA
518	1	Dimethyl phthalate	5.00E-01	mg/kg			NoC
518	1	Di-n-butyl phthalate	5.00E-01	mg/kg		3.26E+02	NoA
518	1	Di-n-octylphthalate	2.40E+00	mg/kg		1.30E+02	NoA
518	1	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
518	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
518	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
518	1	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
518	1	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
518	1	Hexachlorocyclopentadiene	2.40E+00	mg/kg		1.95E+01	NoA
518	1	Hexachloroethane	2.40E+00	mg/kg		2.28E+00	Yes
518	1	Isophorone	2.40E+00	mg/kg		1.82E+02	NoA
518	1	Lead	2.00E+02	mg/kg	3.60E+01	4.00E+02	NoA
518	1	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
518	1	Mercury	2.00E-01	mg/kg	2.00E-01	2.13E-01	NoA
518	1	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
518	1	Molybdenum	2.21E+00	mg/kg		2.30E+01	NoA
518	1	Naphthalene	2.40E+00	mg/kg		1.15E+00	Yes

A = <Child Resident NAL C = no NAL available
B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
518	1	Nitrobenzene	2.40E+00	mg/kg		4.79E+00	NoA
518	1	N-Nitroso-di-n-propylamine	2.40E+00	mg/kg		1.89E-02	Yes
518	1	N-Nitrosodiphenylamine	2.40E+00	mg/kg		3.22E+01	NoA
518	1	Pentachlorophenol	2.40E+00	mg/kg		4.36E-01	Yes
518	1	Phenanthrene	5.00E-01	mg/kg			NoC
518	1	Phenol	2.40E+00	mg/kg		4.98E+02	NoA
518	1	p-Nitroaniline	2.40E+00	mg/kg		8.66E+00	NoA
518	1	Pyridine	2.40E+00	mg/kg		7.82E+00	NoA
518	1	Selenium	1.77E+01	mg/kg	8.00E-01	2.30E+01	NoA
518	1	Silver	4.00E+00	mg/kg	2.30E+00	2.61E+00	Yes
518	1	Sodium	8.85E+01	mg/kg	3.20E+02		NoBE
518	1	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
518	1	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
518	1	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
518	1	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
518	1	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
518	1	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
518	1	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
518	1	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
518	1	Vinyl acetate	1.20E-02	mg/kg		1.83E+01	NoA
518	1	Vinyl chloride	1.20E-02	mg/kg		8.24E-02	NoA
518	1	Zinc	2.00E+02	mg/kg	6.50E+01	1.38E+03	NoA
520	1	1,1,1-Trichloroethane	5.00E-03	mg/kg		1.46E+02	NoA
520	1	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
520	1	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
520	1	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
520	1	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
520	1	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
520	1	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
520	1	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
520	1	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
520	1	2,4-Dinitrophenol	1.60E+00	mg/kg		6.52E+00	NoA
520	1	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
520	1	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
520	1	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
520	1	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
520	1	2-Methyl-4,6-dinitrophenol	1.60E+00	mg/kg		2.61E-01	Yes
520	1	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
520	1	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
520	1	2-Nitrobenzenamine	1.60E+00	mg/kg		2.96E-01	Yes
520	1	2-Nitrophenol	3.40E-01	mg/kg			NoC
520	1	3,3'-Dichlorobenzidine	1.60E+00	mg/kg		3.85E-01	Yes
520	1	3-Nitrobenzenamine	1.60E+00	mg/kg		9.78E-01	Yes
520	1	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
520	1	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
520	1	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
520	1	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
520	1	4-Nitrophenol	1.60E+00	mg/kg			NoC
520	1	Acenaphthene	4.90E-01	mg/kg		1.17E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	1	Acenaphthylene	4.90E-01	mg/kg			NoC
520	1	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
520	1	Antimony	9.30E+00	mg/kg	2.10E-01	5.52E-01	Yes
520	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
520	1	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
520	1	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
520	1	Benzoic acid	1.60E+00	mg/kg		1.30E+04	NoA
520	1	Beryllium	4.65E-01	mg/kg	6.70E-01	5.67E-03	NoB
520	1	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
520	1	Bis(2-chloroethyl) ether	6.80E-03	mg/kg		2.14E-01	NoA
520	1	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
520	1	Bis(2-ethylhexyl)phthalate	3.40E-01	mg/kg		1.25E+01	NoA
520	1	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
520	1	Cadmium	1.86E+00	mg/kg	2.10E-01	8.11E-01	Yes
520	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
520	1	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
520	1	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
520	1	Dimethyl phthalate	3.40E-01	mg/kg			NoC
520	1	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA
520	1	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
520	1	Fluoranthene	4.90E-01	mg/kg		1.09E+02	NoA
520	1	Fluorene	4.90E-01	mg/kg		9.15E+01	NoA
520	1	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
520	1	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
520	1	Hexachlorocyclopentadiene	1.60E+00	mg/kg		1.95E+01	NoA
520	1	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
520	1	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
520	1	Lead	1.86E+01	mg/kg	3.60E+01	4.00E+02	NoAB
520	1	m,p-Cresol	6.80E-01	mg/kg		3.91E+01	NoA
520	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
520	1	Naphthalene	4.90E-01	mg/kg		1.15E+00	NoA
520	1	Nitrobenzene	1.60E+00	mg/kg		4.79E+00	NoA
520	1	N-Nitroso-di-n-propylamine	6.80E-03	mg/kg		1.89E-02	NoA
520	1	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
520	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
520	1	Pentachlorophenol	1.60E+00	mg/kg		4.36E-01	Yes
520	1	Phenanthrene	4.90E-01	mg/kg			NoC
520	1	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
520	1	p-Nitroaniline	1.60E+00	mg/kg		8.66E+00	NoA
520	1	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
520	1	Pyridine	6.80E-01	mg/kg		7.82E+00	NoA
520	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
520	1	Sodium	9.30E+01	mg/kg	3.20E+02		NoBE
520	1	Thallium	1.86E+01	mg/kg	2.10E-01	3.68E-01	Yes
520	1	Trichloroethene	5.00E-03	mg/kg		2.34E-02	NoA
520	1	Zinc	1.86E+01	mg/kg	6.50E+01	1.38E+03	NoAB
520	2	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
520	2	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
520	2	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	2	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
520	2	1,1-Dichloroethene	1.00E-02	mg/kg		2.37E-02	NoA
520	2	1,2,4-Trichlorobenzene	5.00E-01	mg/kg		7.86E-01	NoA
520	2	1,2-Dichlorobenzene	5.00E-01	mg/kg		2.92E+01	NoA
520	2	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
520	2	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
520	2	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
520	2	1,3-Dichlorobenzene	5.00E-01	mg/kg			NoC
520	2	1,4-Dichlorobenzene	5.00E-01	mg/kg		8.13E-01	NoA
520	2	2,4,5-Trichlorophenol	5.00E-01	mg/kg		3.26E+02	NoA
520	2	2,4,6-Trichlorophenol	5.00E-01	mg/kg		3.26E+00	NoA
520	2	2,4-Dichlorophenol	5.00E-01	mg/kg		9.78E+00	NoA
520	2	2,4-Dimethylphenol	5.00E-01	mg/kg		6.52E+01	NoA
520	2	2,4-Dinitrophenol	1.60E+00	mg/kg		6.52E+00	NoA
520	2	2,4-Dinitrotoluene	5.00E-01	mg/kg		5.63E-01	NoA
520	2	2,6-Dinitrotoluene	5.00E-01	mg/kg		3.26E+00	NoA
520	2	2-Butanone	1.00E-02	mg/kg		5.78E+02	NoA
520	2	2-Chloronaphthalene	5.00E-01	mg/kg		6.26E+02	NoA
520	2	2-Chlorophenol	5.00E-01	mg/kg		3.91E+01	NoA
520	2	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
520	2	2-Methyl-4,6-dinitrophenol	1.60E+00	mg/kg		2.61E-01	Yes
520	2	2-Methylnaphthalene	5.00E-01	mg/kg		1.30E+01	NoA
520	2	2-Methylphenol	5.00E-01	mg/kg		1.54E+02	NoA
520	2	2-Nitrobenzenamine	1.60E+00	mg/kg		2.96E-01	Yes
520	2	2-Nitrophenol	5.00E-01	mg/kg			NoC
520	2	3,3'-Dichlorobenzidine	1.60E+00	mg/kg		3.85E-01	Yes
520	2	3-Nitrobenzenamine	1.60E+00	mg/kg		9.78E-01	Yes
520	2	4-Bromophenyl phenyl ether	5.00E-01	mg/kg			NoC
520	2	4-Chloro-3-methylphenol	5.00E-01	mg/kg			NoC
520	2	4-Chlorobenzenamine	5.00E-01	mg/kg		8.66E-01	NoA
520	2	4-Chlorophenyl phenyl ether	5.00E-01	mg/kg			NoC
520	2	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
520	2	4-Methylphenol	5.00E-01	mg/kg		3.26E+02	NoA
520	2	4-Nitrophenol	1.60E+00	mg/kg			NoC
520	2	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
520	2	Acenaphthylene	5.00E-01	mg/kg			NoC
520	2	Acetone	1.00E-02	mg/kg		1.34E+03	NoA
520	2	Anthracene	4.90E-01	mg/kg		7.47E+02	NoA
520	2	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
520	2	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
520	2	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
520	2	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
520	2	Benzo(ghi)perylene	4.90E-01	mg/kg			NoC
520	2	Benzoic acid	1.60E+00	mg/kg		1.30E+04	NoA
520	2	Bis(2-chloroethoxy)methane	5.00E-01	mg/kg		9.78E+00	NoA
520	2	Bis(2-chloroethyl) ether	5.00E-01	mg/kg		2.14E-01	Yes
520	2	Bis(2-chloroisopropyl) ether	5.00E-01	mg/kg		4.57E+00	NoA
520	2	Bis(2-ethylhexyl)phthalate	4.90E-01	mg/kg		1.25E+01	NoA
520	2	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	2	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
520	2	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
520	2	Butyl benzyl phthalate	4.90E-01	mg/kg		9.18E+01	NoA
520	2	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
520	2	Carbazole	5.00E-01	mg/kg		8.72E+00	NoA
520	2	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
520	2	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
520	2	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
520	2	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
520	2	Cyanide	1.00E+00	mg/kg		4.69E+00	NoA
520	2	Dibenzofuran	5.00E-01	mg/kg		3.26E+00	NoA
520	2	Diethyl phthalate	5.00E-01	mg/kg		2.61E+03	NoA
520	2	Dimethyl phthalate	5.00E-01	mg/kg			NoC
520	2	Di-n-butyl phthalate	5.00E-01	mg/kg		3.26E+02	NoA
520	2	Di-n-octylphthalate	5.00E-01	mg/kg		1.30E+02	NoA
520	2	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
520	2	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
520	2	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
520	2	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
520	2	Hexachlorocyclopentadiene	1.60E+00	mg/kg		1.95E+01	NoA
520	2	Hexachloroethane	5.00E-01	mg/kg		2.28E+00	NoA
520	2	Isophorone	5.00E-01	mg/kg		1.82E+02	NoA
520	2	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
520	2	m,p-Cresol	6.80E-01	mg/kg		3.91E+01	NoA
520	2	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
520	2	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
520	2	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
520	2	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
520	2	Nitrobenzene	1.60E+00	mg/kg		4.79E+00	NoA
520	2	N-Nitroso-di-n-propylamine	5.00E-01	mg/kg		1.89E-02	Yes
520	2	N-Nitrosodiphenylamine	5.00E-01	mg/kg		3.22E+01	NoA
520	2	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
520	2	Pentachlorophenol	1.60E+00	mg/kg		4.36E-01	Yes
520	2	Phenanthrene	4.90E-01	mg/kg			NoC
520	2	Phenol	5.00E-01	mg/kg		4.98E+02	NoA
520	2	p-Nitroaniline	1.60E+00	mg/kg		8.66E+00	NoA
520	2	Pyrene	4.90E-01	mg/kg		8.12E+01	NoA
520	2	Pyridine	6.80E-01	mg/kg		7.82E+00	NoA
520	2	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
520	2	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
520	2	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
520	2	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
520	2	Thallium	2.00E+01	mg/kg	2.10E-01	3.68E-01	Yes
520	2	Tin	1.00E+03	mg/kg		4.69E+03	NoA
520	2	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
520	2	trans-1,2-Dichloroethene	1.00E-02	mg/kg		2.43E+00	NoA
520	2	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
520	2	Trichloroethene	1.00E-02	mg/kg		2.34E-02	NoA
520	3	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	3	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
520	3	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
520	3	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
520	3	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
520	3	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
520	3	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
520	3	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
520	3	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
520	3	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
520	3	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
520	3	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
520	3	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
520	3	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
520	3	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
520	3	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
520	3	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
520	3	2-Nitrophenol	3.50E-01	mg/kg			NoC
520	3	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
520	3	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
520	3	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
520	3	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
520	3	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
520	3	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
520	3	4-Nitrophenol	1.70E+00	mg/kg			NoC
520	3	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
520	3	Acenaphthylene	3.50E-01	mg/kg			NoC
520	3	Anthracene	3.50E-01	mg/kg		7.47E+02	NoA
520	3	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
520	3	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
520	3	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
520	3	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
520	3	Bis(2-chloroethyl) ether	7.00E-03	mg/kg		2.14E-01	NoA
520	3	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA
520	3	Bis(2-ethylhexyl)phthalate	3.50E-01	mg/kg		1.25E+01	NoA
520	3	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
520	3	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
520	3	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
520	3	Dimethyl phthalate	3.50E-01	mg/kg			NoC
520	3	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
520	3	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
520	3	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
520	3	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
520	3	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
520	3	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
520	3	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
520	3	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
520	3	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
520	3	m,p-Cresol	7.00E-01	mg/kg		3.91E+01	NoA
520	3	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	3	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
520	3	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
520	3	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
520	3	N-Nitroso-di-n-propylamine	7.00E-03	mg/kg		1.89E-02	NoA
520	3	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
520	3	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
520	3	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
520	3	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
520	3	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
520	3	Pyridine	7.00E-01	mg/kg		7.82E+00	NoA
520	3	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
520	4	1,2,4-Trichlorobenzene	3.40E-01	mg/kg		7.86E-01	NoA
520	4	1,2-Dichlorobenzene	3.40E-01	mg/kg		2.92E+01	NoA
520	4	1,3-Dichlorobenzene	3.40E-01	mg/kg			NoC
520	4	1,4-Dichlorobenzene	3.40E-01	mg/kg		8.13E-01	NoA
520	4	2,4,5-Trichlorophenol	3.40E-01	mg/kg		3.26E+02	NoA
520	4	2,4,6-Trichlorophenol	3.40E-01	mg/kg		3.26E+00	NoA
520	4	2,4-Dichlorophenol	3.40E-01	mg/kg		9.78E+00	NoA
520	4	2,4-Dimethylphenol	3.40E-01	mg/kg		6.52E+01	NoA
520	4	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
520	4	2,4-Dinitrotoluene	3.40E-01	mg/kg		5.63E-01	NoA
520	4	2,6-Dinitrotoluene	3.40E-01	mg/kg		3.26E+00	NoA
520	4	2-Chloronaphthalene	3.40E-01	mg/kg		6.26E+02	NoA
520	4	2-Chlorophenol	3.40E-01	mg/kg		3.91E+01	NoA
520	4	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
520	4	2-Methylnaphthalene	3.40E-01	mg/kg		1.30E+01	NoA
520	4	2-Methylphenol	3.40E-01	mg/kg		1.54E+02	NoA
520	4	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
520	4	2-Nitrophenol	3.40E-01	mg/kg			NoC
520	4	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
520	4	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
520	4	4-Bromophenyl phenyl ether	3.40E-01	mg/kg			NoC
520	4	4-Chloro-3-methylphenol	3.40E-01	mg/kg			NoC
520	4	4-Chlorobenzenamine	3.40E-01	mg/kg		8.66E-01	NoA
520	4	4-Chlorophenyl phenyl ether	3.40E-01	mg/kg			NoC
520	4	4-Nitrophenol	1.70E+00	mg/kg			NoC
520	4	Acenaphthene	3.40E-01	mg/kg		1.17E+02	NoA
520	4	Acenaphthylene	3.40E-01	mg/kg			NoC
520	4	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
520	4	Benzenemethanol	3.40E-01	mg/kg		3.26E+02	NoA
520	4	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
520	4	Bis(2-chloroethoxy)methane	3.40E-01	mg/kg		9.78E+00	NoA
520	4	Bis(2-chloroethyl) ether	6.90E-03	mg/kg		2.14E-01	NoA
520	4	Bis(2-chloroisopropyl) ether	3.40E-01	mg/kg		4.57E+00	NoA
520	4	Butyl benzyl phthalate	3.40E-01	mg/kg		9.18E+01	NoA
520	4	Dibenzofuran	3.40E-01	mg/kg		3.26E+00	NoA
520	4	Diethyl phthalate	3.40E-01	mg/kg		2.61E+03	NoA
520	4	Dimethyl phthalate	3.40E-01	mg/kg			NoC
520	4	Di-n-butyl phthalate	3.40E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	4	Di-n-octylphthalate	3.40E-01	mg/kg		1.30E+02	NoA
520	4	Fluorene	3.40E-01	mg/kg		9.15E+01	NoA
520	4	Hexachlorobenzene	3.40E-01	mg/kg		4.92E-02	Yes
520	4	Hexachlorobutadiene	3.40E-01	mg/kg		2.22E+00	NoA
520	4	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
520	4	Hexachloroethane	3.40E-01	mg/kg		2.28E+00	NoA
520	4	Isophorone	3.40E-01	mg/kg		1.82E+02	NoA
520	4	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
520	4	m,p-Cresol	6.90E-01	mg/kg		3.91E+01	NoA
520	4	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
520	4	Naphthalene	3.40E-01	mg/kg		1.15E+00	NoA
520	4	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
520	4	N-Nitroso-di-n-propylamine	6.90E-03	mg/kg		1.89E-02	NoA
520	4	N-Nitrosodiphenylamine	3.40E-01	mg/kg		3.22E+01	NoA
520	4	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
520	4	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
520	4	Phenol	3.40E-01	mg/kg		4.98E+02	NoA
520	4	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
520	4	Pyridine	6.90E-01	mg/kg		7.82E+00	NoA
520	4	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
520	5	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
520	5	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
520	5	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
520	5	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
520	5	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
520	5	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA
520	5	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
520	5	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
520	5	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
520	5	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
520	5	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
520	5	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
520	5	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
520	5	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
520	5	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
520	5	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
520	5	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
520	5	2-Nitrophenol	3.60E-01	mg/kg			NoC
520	5	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
520	5	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
520	5	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
520	5	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
520	5	4-Chlorobenzenamine	3.60E-01	mg/kg		8.66E-01	NoA
520	5	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
520	5	4-Nitrophenol	1.80E+00	mg/kg			NoC
520	5	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
520	5	Acenaphthylene	3.60E-01	mg/kg			NoC
520	5	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
520	5	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
520	5	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
520	5	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
520	5	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
520	5	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
520	5	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
520	5	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
520	5	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
520	5	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
520	5	Dimethyl phthalate	3.60E-01	mg/kg			NoC
520	5	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
520	5	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
520	5	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
520	5	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
520	5	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
520	5	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
520	5	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
520	5	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
520	5	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA
520	5	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
520	5	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
520	5	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
520	5	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
520	5	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
520	5	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
520	5	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
520	5	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
520	5	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
520	5	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
520	5	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
520	5	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
520	5	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
520	5	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
81	1	1,1,1-Trichloroethane	6.00E-03	mg/kg		1.46E+02	NoA
81	1	1,1,2,2-Tetrachloroethane	6.00E-03	mg/kg		5.62E-01	NoA
81	1	1,1,2-Trichloroethane	6.00E-03	mg/kg		2.30E-02	NoA
81	1	1,1-Dichloroethane	6.00E-03	mg/kg		1.34E+00	NoA
81	1	1,1-Dichloroethene	6.00E-03	mg/kg		2.37E-02	NoA
81	1	1,2,4-Trichlorobenzene	4.20E-01	mg/kg		7.86E-01	NoA
81	1	1,2-Dichlorobenzene	4.20E-01	mg/kg		2.92E+01	NoA
81	1	1,2-Dichloroethane	6.00E-03	mg/kg		1.55E-01	NoA
81	1	1,2-Dichloroethene	6.00E-03	mg/kg		1.24E+00	NoA
81	1	1,2-Dichloropropane	6.00E-03	mg/kg		9.40E-01	NoA
81	1	1,3-Dichlorobenzene	4.20E-01	mg/kg			NoC
81	1	1,4-Dichlorobenzene	4.20E-01	mg/kg		8.13E-01	NoA
81	1	2,4,5-Trichlorophenol	2.10E+00	mg/kg		3.26E+02	NoA
81	1	2,4,6-Trichlorophenol	4.20E-01	mg/kg		3.26E+00	NoA
81	1	2,4-Dichlorophenol	4.20E-01	mg/kg		9.78E+00	NoA
81	1	2,4-Dimethylphenol	4.20E-01	mg/kg		6.52E+01	NoA
81	1	2,4-Dinitrophenol	2.10E+00	mg/kg		6.52E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
81	1	2,4-Dinitrotoluene	4.20E-01	mg/kg		5.63E-01	NoA
81	1	2,6-Dinitrotoluene	4.20E-01	mg/kg		3.26E+00	NoA
81	1	2-Butanone	1.30E-02	mg/kg		5.78E+02	NoA
81	1	2-Chloronaphthalene	4.20E-01	mg/kg		6.26E+02	NoA
81	1	2-Chlorophenol	4.20E-01	mg/kg		3.91E+01	NoA
81	1	2-Hexanone	1.30E-02	mg/kg		4.05E+00	NoA
81	1	2-Methyl-4,6-dinitrophenol	2.10E+00	mg/kg		2.61E-01	Yes
81	1	2-Methylnaphthalene	4.20E-01	mg/kg		1.30E+01	NoA
81	1	2-Methylphenol	4.20E-01	mg/kg		1.54E+02	NoA
81	1	2-Nitrobenzenamine	2.10E+00	mg/kg		2.96E-01	Yes
81	1	2-Nitrophenol	4.20E-01	mg/kg			NoC
81	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
81	1	3-Nitrobenzenamine	2.10E+00	mg/kg		9.78E-01	Yes
81	1	4-Bromophenyl phenyl ether	4.20E-01	mg/kg			NoC
81	1	4-Chloro-3-methylphenol	4.20E-01	mg/kg			NoC
81	1	4-Chlorobenzeneamine	4.20E-01	mg/kg		8.66E-01	NoA
81	1	4-Chlorophenyl phenyl ether	4.20E-01	mg/kg			NoC
81	1	4-Methyl-2-pentanone	1.30E-02	mg/kg		1.13E+02	NoA
81	1	4-Nitrophenol	2.10E+00	mg/kg			NoC
81	1	Acenaphthene	4.20E-01	mg/kg		1.17E+02	NoA
81	1	Acenaphthylene	4.20E-01	mg/kg			NoC
81	1	Acetone	1.30E-02	mg/kg		1.34E+03	NoA
81	1	Anthracene	4.20E-01	mg/kg		7.47E+02	NoA
81	1	Antimony	1.31E+01	mg/kg	2.10E-01	5.52E-01	Yes
81	1	Benzene	6.00E-03	mg/kg		3.33E-01	NoA
81	1	Benzenemethanol	4.20E-01	mg/kg		3.26E+02	NoA
81	1	Benzo(ghi)perylene	4.20E-01	mg/kg			NoC
81	1	Benzoic acid	2.10E+00	mg/kg		1.30E+04	NoA
81	1	Bis(2-chloroethoxy)methane	4.20E-01	mg/kg		9.78E+00	NoA
81	1	Bis(2-chloroethyl) ether	4.20E-01	mg/kg		2.14E-01	Yes
81	1	Bis(2-chloroisopropyl) ether	4.20E-01	mg/kg		4.57E+00	NoA
81	1	Bis(2-ethylhexyl)phthalate	5.90E-01	mg/kg		1.25E+01	NoA
81	1	Bromodichloromethane	6.00E-03	mg/kg		2.73E-01	NoA
81	1	Bromoform	6.00E-03	mg/kg		2.19E+01	NoA
81	1	Bromomethane	1.30E-02	mg/kg		1.34E-01	NoA
81	1	Butyl benzyl phthalate	4.20E-01	mg/kg		9.18E+01	NoA
81	1	Carbon disulfide	6.00E-03	mg/kg		1.48E+01	NoA
81	1	Carbon tetrachloride	6.00E-03	mg/kg		2.39E-01	NoA
81	1	Chlorobenzene	6.00E-03	mg/kg		4.07E+00	NoA
81	1	Chloroethane	1.30E-02	mg/kg		1.45E+03	NoA
81	1	Chloroform	6.00E-03	mg/kg		1.22E-01	NoA
81	1	Chloromethane	1.30E-02	mg/kg		1.65E+00	NoA
81	1	cis-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
81	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
81	1	Dibenzofuran	4.20E-01	mg/kg		3.26E+00	NoA
81	1	Dibromochloromethane	6.00E-03	mg/kg		2.42E-01	NoA
81	1	Diethyl phthalate	4.20E-01	mg/kg		2.61E+03	NoA
81	1	Dimethyl phthalate	4.20E-01	mg/kg			NoC
81	1	Di-n-butyl phthalate	4.20E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
81	1	Di-n-octylphthalate	4.20E-01	mg/kg		1.30E+02	NoA
81	1	Ethylbenzene	6.00E-03	mg/kg		1.58E+00	NoA
81	1	Fluoranthene	4.20E-01	mg/kg		1.09E+02	NoA
81	1	Fluorene	4.20E-01	mg/kg		9.15E+01	NoA
81	1	Hexachlorobenzene	4.20E-01	mg/kg		4.92E-02	Yes
81	1	Hexachlorobutadiene	4.20E-01	mg/kg		2.22E+00	NoA
81	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
81	1	Hexachloroethane	4.20E-01	mg/kg		2.28E+00	NoA
81	1	Isophorone	4.20E-01	mg/kg		1.82E+02	NoA
81	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
81	1	m,p-Cresol	7.10E-01	mg/kg		3.91E+01	NoA
81	1	Magnesium	1.80E+03	mg/kg	7.70E+03		NoBE
81	1	Manganese	7.14E+02	mg/kg	1.50E+03	4.19E+02	NoB
81	1	Methylene chloride	6.00E-03	mg/kg		3.65E+00	NoA
81	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
81	1	Naphthalene	4.20E-01	mg/kg		1.15E+00	NoA
81	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
81	1	N-Nitroso-di-n-propylamine	4.20E-01	mg/kg		1.89E-02	Yes
81	1	N-Nitrosodiphenylamine	4.20E-01	mg/kg		3.22E+01	NoA
81	1	Pentachlorophenol	2.10E+00	mg/kg		4.36E-01	Yes
81	1	Phenanthrene	4.20E-01	mg/kg			NoC
81	1	Phenol	4.20E-01	mg/kg		4.98E+02	NoA
81	1	p-Nitroaniline	2.10E+00	mg/kg		8.66E+00	NoA
81	1	Pyrene	4.20E-01	mg/kg		8.12E+01	NoA
81	1	Pyridine	7.10E-01	mg/kg		7.82E+00	NoA
81	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
81	1	Sodium	1.11E+02	mg/kg	3.20E+02		NoBE
81	1	Styrene	6.00E-03	mg/kg		9.43E+01	NoA
81	1	Tetrachloroethene	6.00E-03	mg/kg		1.13E-01	NoA
81	1	Thallium	8.00E-01	mg/kg	2.10E-01	3.68E-01	Yes
81	1	Toluene	6.00E-03	mg/kg		9.61E+01	NoA
81	1	Total Xylene	6.00E-03	mg/kg		7.96E+00	NoA
81	1	trans-1,3-Dichloropropene	6.00E-03	mg/kg			NoC
81	1	Trichloroethene	6.00E-03	mg/kg		2.34E-02	NoA
81	1	Vanadium	2.74E+01	mg/kg	3.80E+01	3.65E-02	NoB
81	1	Vinyl acetate	1.30E-02	mg/kg		1.83E+01	NoA
81	1	Vinyl chloride	1.30E-02	mg/kg		8.24E-02	NoA
81	1	Zinc	4.99E+01	mg/kg	6.50E+01	1.38E+03	NoAB
153	1	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
153	1	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
153	1	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
153	1	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
153	1	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
153	1	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
153	1	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
153	1	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
153	1	2,4-Dinitrophenol	1.90E+00	mg/kg		6.52E+00	NoA
153	1	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
153	1	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
153	1	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
153	1	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
153	1	2-Methyl-4,6-dinitrophenol	1.90E+00	mg/kg		2.61E-01	Yes
153	1	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
153	1	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
153	1	2-Nitrobenzenamine	1.90E+00	mg/kg		2.96E-01	Yes
153	1	2-Nitrophenol	3.80E-01	mg/kg			NoC
153	1	3,3'-Dichlorobenzidine	1.90E+00	mg/kg		3.85E-01	Yes
153	1	3-Nitrobenzenamine	1.90E+00	mg/kg		9.78E-01	Yes
153	1	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
153	1	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
153	1	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
153	1	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
153	1	4-Nitrophenol	1.90E+00	mg/kg			NoC
153	1	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
153	1	Acenaphthylene	3.80E-01	mg/kg			NoC
153	1	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
153	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
153	1	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
153	1	Benzo(ghi)perylene	3.80E-01	mg/kg			NoC
153	1	Benzoic acid	1.90E+00	mg/kg		1.30E+04	NoA
153	1	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
153	1	Bis(2-chloroethyl) ether	7.70E-03	mg/kg		2.14E-01	NoA
153	1	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
153	1	Bis(2-ethylhexyl)phthalate	3.80E-01	mg/kg		1.25E+01	NoA
153	1	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
153	1	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
153	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
153	1	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
153	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
153	1	Dimethyl phthalate	3.80E-01	mg/kg			NoC
153	1	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
153	1	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
153	1	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
153	1	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
153	1	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA
153	1	Hexachlorocyclopentadiene	1.90E+00	mg/kg		1.95E+01	NoA
153	1	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
153	1	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
153	1	m,p-Cresol	7.70E-01	mg/kg		3.91E+01	NoA
153	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
153	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
153	1	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
153	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
153	1	Nitrobenzene	1.90E+00	mg/kg		4.79E+00	NoA
153	1	N-Nitroso-di-n-propylamine	7.70E-03	mg/kg		1.89E-02	NoA
153	1	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
153	1	Pentachlorophenol	1.90E+00	mg/kg		4.36E-01	Yes
153	1	Phenol	3.80E-01	mg/kg		4.98E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
153	1	p-Nitroaniline	1.90E+00	mg/kg		8.66E+00	NoA
153	1	Pyridine	7.70E-01	mg/kg		7.82E+00	NoA
153	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
153	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
153	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
156	1	1,2,4-Trichlorobenzene	3.80E-01	mg/kg		7.86E-01	NoA
156	1	1,2-Dichlorobenzene	3.80E-01	mg/kg		2.92E+01	NoA
156	1	1,3-Dichlorobenzene	3.80E-01	mg/kg			NoC
156	1	1,4-Dichlorobenzene	3.80E-01	mg/kg		8.13E-01	NoA
156	1	2,4,5-Trichlorophenol	3.80E-01	mg/kg		3.26E+02	NoA
156	1	2,4,6-Trichlorophenol	3.80E-01	mg/kg		3.26E+00	NoA
156	1	2,4-Dichlorophenol	3.80E-01	mg/kg		9.78E+00	NoA
156	1	2,4-Dimethylphenol	3.80E-01	mg/kg		6.52E+01	NoA
156	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
156	1	2,4-Dinitrotoluene	3.80E-01	mg/kg		5.63E-01	NoA
156	1	2,6-Dinitrotoluene	3.80E-01	mg/kg		3.26E+00	NoA
156	1	2-Chloronaphthalene	3.80E-01	mg/kg		6.26E+02	NoA
156	1	2-Chlorophenol	3.80E-01	mg/kg		3.91E+01	NoA
156	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
156	1	2-Methylnaphthalene	3.80E-01	mg/kg		1.30E+01	NoA
156	1	2-Methylphenol	3.80E-01	mg/kg		1.54E+02	NoA
156	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
156	1	2-Nitrophenol	3.80E-01	mg/kg			NoC
156	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
156	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
156	1	4-Bromophenyl phenyl ether	3.80E-01	mg/kg			NoC
156	1	4-Chloro-3-methylphenol	3.80E-01	mg/kg			NoC
156	1	4-Chlorobenzenamine	3.80E-01	mg/kg		8.66E-01	NoA
156	1	4-Chlorophenyl phenyl ether	3.80E-01	mg/kg			NoC
156	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
156	1	Acenaphthene	3.80E-01	mg/kg		1.17E+02	NoA
156	1	Acenaphthylene	3.80E-01	mg/kg			NoC
156	1	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
156	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
156	1	Benzenemethanol	3.80E-01	mg/kg		3.26E+02	NoA
156	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
156	1	Bis(2-chloroethoxy)methane	3.80E-01	mg/kg		9.78E+00	NoA
156	1	Bis(2-chloroethyl) ether	7.50E-03	mg/kg		2.14E-01	NoA
156	1	Bis(2-chloroisopropyl) ether	3.80E-01	mg/kg		4.57E+00	NoA
156	1	Butyl benzyl phthalate	3.80E-01	mg/kg		9.18E+01	NoA
156	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
156	1	Dibenzofuran	3.80E-01	mg/kg		3.26E+00	NoA
156	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
156	1	Dimethyl phthalate	3.80E-01	mg/kg			NoC
156	1	Di-n-butyl phthalate	3.80E-01	mg/kg		3.26E+02	NoA
156	1	Di-n-octylphthalate	3.80E-01	mg/kg		1.30E+02	NoA
156	1	Fluorene	3.80E-01	mg/kg		9.15E+01	NoA
156	1	Hexachlorobenzene	3.80E-01	mg/kg		4.92E-02	Yes
156	1	Hexachlorobutadiene	3.80E-01	mg/kg		2.22E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
156	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
156	1	Hexachloroethane	3.80E-01	mg/kg		2.28E+00	NoA
156	1	Isophorone	3.80E-01	mg/kg		1.82E+02	NoA
156	1	m,p-Cresol	7.50E-01	mg/kg		3.91E+01	NoA
156	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
156	1	Naphthalene	3.80E-01	mg/kg		1.15E+00	NoA
156	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
156	1	N-Nitroso-di-n-propylamine	7.50E-03	mg/kg		1.89E-02	NoA
156	1	N-Nitrosodiphenylamine	3.80E-01	mg/kg		3.22E+01	NoA
156	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
156	1	Phenol	3.80E-01	mg/kg		4.98E+02	NoA
156	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
156	1	Pyridine	7.50E-01	mg/kg		7.82E+00	NoA
156	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
156	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
160	1	1,2,4-Trichlorobenzene	3.50E-01	mg/kg		7.86E-01	NoA
160	1	1,2-Dichlorobenzene	3.50E-01	mg/kg		2.92E+01	NoA
160	1	1,3-Dichlorobenzene	3.50E-01	mg/kg			NoC
160	1	1,4-Dichlorobenzene	3.50E-01	mg/kg		8.13E-01	NoA
160	1	2,4,5-Trichlorophenol	3.50E-01	mg/kg		3.26E+02	NoA
160	1	2,4,6-Trichlorophenol	3.50E-01	mg/kg		3.26E+00	NoA
160	1	2,4-Dichlorophenol	3.50E-01	mg/kg		9.78E+00	NoA
160	1	2,4-Dimethylphenol	3.50E-01	mg/kg		6.52E+01	NoA
160	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA
160	1	2,4-Dinitrotoluene	3.50E-01	mg/kg		5.63E-01	NoA
160	1	2,6-Dinitrotoluene	3.50E-01	mg/kg		3.26E+00	NoA
160	1	2-Chloronaphthalene	3.50E-01	mg/kg		6.26E+02	NoA
160	1	2-Chlorophenol	3.50E-01	mg/kg		3.91E+01	NoA
160	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
160	1	2-Methylnaphthalene	3.50E-01	mg/kg		1.30E+01	NoA
160	1	2-Methylphenol	3.50E-01	mg/kg		1.54E+02	NoA
160	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
160	1	2-Nitrophenol	3.50E-01	mg/kg			NoC
160	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
160	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
160	1	4-Bromophenyl phenyl ether	3.50E-01	mg/kg			NoC
160	1	4-Chloro-3-methylphenol	3.50E-01	mg/kg			NoC
160	1	4-Chlorobenzenamine	3.50E-01	mg/kg		8.66E-01	NoA
160	1	4-Chlorophenyl phenyl ether	3.50E-01	mg/kg			NoC
160	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
160	1	Acenaphthene	3.50E-01	mg/kg		1.17E+02	NoA
160	1	Acenaphthylene	3.50E-01	mg/kg			NoC
160	1	Anthracene	3.50E-01	mg/kg		7.47E+02	NoA
160	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
160	1	Benzenemethanol	3.50E-01	mg/kg		3.26E+02	NoA
160	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
160	1	Bis(2-chloroethoxy)methane	3.50E-01	mg/kg		9.78E+00	NoA
160	1	Bis(2-chloroethyl) ether	7.00E-03	mg/kg		2.14E-01	NoA
160	1	Bis(2-chloroisopropyl) ether	3.50E-01	mg/kg		4.57E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
160	1	Bis(2-ethylhexyl)phthalate	3.50E-01	mg/kg		1.25E+01	NoA
160	1	Butyl benzyl phthalate	3.50E-01	mg/kg		9.18E+01	NoA
160	1	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
160	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
160	1	Dibenzofuran	3.50E-01	mg/kg		3.26E+00	NoA
160	1	Diethyl phthalate	3.50E-01	mg/kg		2.61E+03	NoA
160	1	Dimethyl phthalate	3.50E-01	mg/kg			NoC
160	1	Di-n-butyl phthalate	3.50E-01	mg/kg		3.26E+02	NoA
160	1	Di-n-octylphthalate	3.50E-01	mg/kg		1.30E+02	NoA
160	1	Fluorene	3.50E-01	mg/kg		9.15E+01	NoA
160	1	Hexachlorobenzene	3.50E-01	mg/kg		4.92E-02	Yes
160	1	Hexachlorobutadiene	3.50E-01	mg/kg		2.22E+00	NoA
160	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
160	1	Hexachloroethane	3.50E-01	mg/kg		2.28E+00	NoA
160	1	Isophorone	3.50E-01	mg/kg		1.82E+02	NoA
160	1	m,p-Cresol	7.00E-01	mg/kg		3.91E+01	NoA
160	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
160	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
160	1	Naphthalene	3.50E-01	mg/kg		1.15E+00	NoA
160	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
160	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
160	1	N-Nitroso-di-n-propylamine	7.00E-03	mg/kg		1.89E-02	NoA
160	1	N-Nitrosodiphenylamine	3.50E-01	mg/kg		3.22E+01	NoA
160	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
160	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
160	1	Phenanthrene	3.50E-01	mg/kg			NoC
160	1	Phenol	3.50E-01	mg/kg		4.98E+02	NoA
160	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
160	1	Pyridine	7.00E-01	mg/kg		7.82E+00	NoA
160	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
160	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
160	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
163	1	1,1,1-Trichloroethane	1.00E-02	mg/kg		1.46E+02	NoA
163	1	1,1,2,2-Tetrachloroethane	1.00E-02	mg/kg		5.62E-01	NoA
163	1	1,1,2-Trichloroethane	1.00E-02	mg/kg		2.30E-02	NoA
163	1	1,1-Dichloroethane	1.00E-02	mg/kg		1.34E+00	NoA
163	1	1,1-Dichloroethene	1.68E-01	mg/kg		2.37E-02	Yes
163	1	1,2,4-Trichlorobenzene	5.00E-01	mg/kg		7.86E-01	NoA
163	1	1,2-Dichlorobenzene	5.00E-01	mg/kg		2.92E+01	NoA
163	1	1,2-Dichloroethane	1.00E-02	mg/kg		1.55E-01	NoA
163	1	1,2-Dichloropropane	1.00E-02	mg/kg		9.40E-01	NoA
163	1	1,2-Dimethylbenzene	1.00E-02	mg/kg		5.35E+01	NoA
163	1	1,3-Dichlorobenzene	5.00E-01	mg/kg			NoC
163	1	1,4-Dichlorobenzene	5.00E-01	mg/kg		8.13E-01	NoA
163	1	2,4,5-Trichlorophenol	5.00E-01	mg/kg		3.26E+02	NoA
163	1	2,4,6-Trichlorophenol	5.00E-01	mg/kg		3.26E+00	NoA
163	1	2,4-Dichlorophenol	5.00E-01	mg/kg		9.78E+00	NoA
163	1	2,4-Dimethylphenol	5.00E-01	mg/kg		6.52E+01	NoA
163	1	2,4-Dinitrophenol	1.70E+00	mg/kg		6.52E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
163	1	2,4-Dinitrotoluene	5.00E-01	mg/kg		5.63E-01	NoA
163	1	2,6-Dinitrotoluene	5.00E-01	mg/kg		3.26E+00	NoA
163	1	2-Chloronaphthalene	5.00E-01	mg/kg		6.26E+02	NoA
163	1	2-Chlorophenol	5.00E-01	mg/kg		3.91E+01	NoA
163	1	2-Hexanone	1.00E-02	mg/kg		4.05E+00	NoA
163	1	2-Methyl-4,6-dinitrophenol	1.70E+00	mg/kg		2.61E-01	Yes
163	1	2-Methylnaphthalene	5.00E-01	mg/kg		1.30E+01	NoA
163	1	2-Methylphenol	5.00E-01	mg/kg		1.54E+02	NoA
163	1	2-Nitrobenzenamine	1.70E+00	mg/kg		2.96E-01	Yes
163	1	2-Nitrophenol	5.00E-01	mg/kg			NoC
163	1	3,3'-Dichlorobenzidine	1.70E+00	mg/kg		3.85E-01	Yes
163	1	3-Nitrobenzenamine	1.70E+00	mg/kg		9.78E-01	Yes
163	1	4-Bromophenyl phenyl ether	5.00E-01	mg/kg			NoC
163	1	4-Chloro-3-methylphenol	5.00E-01	mg/kg			NoC
163	1	4-Chlorobenzenamine	5.00E-01	mg/kg		8.66E-01	NoA
163	1	4-Chlorophenyl phenyl ether	5.00E-01	mg/kg			NoC
163	1	4-Methyl-2-pentanone	1.00E-02	mg/kg		1.13E+02	NoA
163	1	4-Nitrophenol	1.70E+00	mg/kg			NoC
163	1	Acenaphthene	5.00E-01	mg/kg		1.17E+02	NoA
163	1	Acenaphthylene	5.00E-01	mg/kg			NoC
163	1	Anthracene	3.80E-01	mg/kg		7.47E+02	NoA
163	1	Antimony	2.00E+01	mg/kg	2.10E-01	5.52E-01	Yes
163	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
163	1	Benzene	1.00E-02	mg/kg		3.33E-01	NoA
163	1	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
163	1	Benzo(ghi)perylene	3.80E-01	mg/kg			NoC
163	1	Benzoic acid	1.70E+00	mg/kg		1.30E+04	NoA
163	1	Beryllium	5.00E-01	mg/kg	6.70E-01	5.67E-03	NoB
163	1	Bis(2-chloroethoxy)methane	5.00E-01	mg/kg		9.78E+00	NoA
163	1	Bis(2-chloroethyl) ether	5.00E-01	mg/kg		2.14E-01	Yes
163	1	Bis(2-chloroisopropyl) ether	5.00E-01	mg/kg		4.57E+00	NoA
163	1	Bis(2-ethylhexyl)phthalate	5.00E-01	mg/kg		1.25E+01	NoA
163	1	Boron	1.00E+02	mg/kg		9.18E+02	NoA
163	1	Bromodichloromethane	1.00E-02	mg/kg		2.73E-01	NoA
163	1	Bromoform	1.00E-02	mg/kg		2.19E+01	NoA
163	1	Bromomethane	1.00E-02	mg/kg		1.34E-01	NoA
163	1	Butyl benzyl phthalate	5.00E-01	mg/kg		9.18E+01	NoA
163	1	Cadmium	2.00E+00	mg/kg	2.10E-01	8.11E-01	Yes
163	1	Carbazole	5.00E-01	mg/kg		8.72E+00	NoA
163	1	Carbon disulfide	1.00E-02	mg/kg		1.48E+01	NoA
163	1	Carbon tetrachloride	1.00E-02	mg/kg		2.39E-01	NoA
163	1	Chlorobenzene	1.00E-02	mg/kg		4.07E+00	NoA
163	1	Chloroethane	1.00E-02	mg/kg		1.45E+03	NoA
163	1	Chloroform	1.00E-02	mg/kg		1.22E-01	NoA
163	1	Chloromethane	1.00E-02	mg/kg		1.65E+00	NoA
163	1	cis-1,2-Dichloroethene	1.68E-01	mg/kg		1.05E+00	NoA
163	1	cis-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
163	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
163	1	Dibenzofuran	5.00E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
163	1	Dibromochloromethane	1.00E-02	mg/kg		2.42E-01	NoA
163	1	Diethyl phthalate	3.80E-01	mg/kg		2.61E+03	NoA
163	1	Dimethyl phthalate	5.00E-01	mg/kg			NoC
163	1	Di-n-butyl phthalate	6.60E-01	mg/kg		3.26E+02	NoA
163	1	Di-n-octylphthalate	5.00E-01	mg/kg		1.30E+02	NoA
163	1	Ethylbenzene	1.00E-02	mg/kg		1.58E+00	NoA
163	1	Fluoranthene	3.80E-01	mg/kg		1.09E+02	NoA
163	1	Fluorene	5.00E-01	mg/kg		9.15E+01	NoA
163	1	Hexachlorobenzene	5.00E-01	mg/kg		4.92E-02	Yes
163	1	Hexachlorobutadiene	5.00E-01	mg/kg		2.22E+00	NoA
163	1	Hexachlorocyclopentadiene	1.70E+00	mg/kg		1.95E+01	NoA
163	1	Hexachloroethane	5.00E-01	mg/kg		2.28E+00	NoA
163	1	Isophorone	5.00E-01	mg/kg		1.82E+02	NoA
163	1	Lead	2.00E+01	mg/kg	3.60E+01	4.00E+02	NoAB
163	1	m,p-Cresol	7.10E-01	mg/kg		3.91E+01	NoA
163	1	m,p-Xylene	2.00E-02	mg/kg		7.96E+00	NoA
163	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
163	1	Methylene chloride	1.00E-02	mg/kg		3.65E+00	NoA
163	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
163	1	Naphthalene	5.00E-01	mg/kg		1.15E+00	NoA
163	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
163	1	Nitrobenzene	1.70E+00	mg/kg		4.79E+00	NoA
163	1	N-Nitroso-di-n-propylamine	5.00E-01	mg/kg		1.89E-02	Yes
163	1	N-Nitrosodiphenylamine	5.00E-01	mg/kg		3.22E+01	NoA
163	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
163	1	Pentachlorophenol	1.70E+00	mg/kg		4.36E-01	Yes
163	1	Phenanthrene	5.00E-01	mg/kg			NoC
163	1	Phenol	5.00E-01	mg/kg		4.98E+02	NoA
163	1	p-Nitroaniline	1.70E+00	mg/kg		8.66E+00	NoA
163	1	Pyrene	3.60E-01	mg/kg		8.12E+01	NoA
163	1	Pyridine	7.10E-01	mg/kg		7.82E+00	NoA
163	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
163	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
163	1	Sodium	2.00E+02	mg/kg	3.20E+02		NoBE
163	1	Styrene	1.00E-02	mg/kg		9.43E+01	NoA
163	1	Tetrachloroethene	1.00E-02	mg/kg		1.13E-01	NoA
163	1	Thallium	1.50E+01	mg/kg	2.10E-01	3.68E-01	Yes
163	1	Toluene	1.00E-02	mg/kg		9.61E+01	NoA
163	1	trans-1,2-Dichloroethene	1.68E-01	mg/kg		2.43E+00	NoA
163	1	trans-1,3-Dichloropropene	1.00E-02	mg/kg			NoC
163	1	Trichloroethene	1.68E-01	mg/kg		2.34E-02	Yes
163	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
163	1	Vinyl chloride	1.68E-01	mg/kg		8.24E-02	Yes
219	1	1,2,4-Trichlorobenzene	3.60E-01	mg/kg		7.86E-01	NoA
219	1	1,2-Dichlorobenzene	3.60E-01	mg/kg		2.92E+01	NoA
219	1	1,3-Dichlorobenzene	3.60E-01	mg/kg			NoC
219	1	1,4-Dichlorobenzene	3.60E-01	mg/kg		8.13E-01	NoA
219	1	2,4,5-Trichlorophenol	3.60E-01	mg/kg		3.26E+02	NoA
219	1	2,4,6-Trichlorophenol	3.60E-01	mg/kg		3.26E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
219	1	2,4-Dichlorophenol	3.60E-01	mg/kg		9.78E+00	NoA
219	1	2,4-Dimethylphenol	3.60E-01	mg/kg		6.52E+01	NoA
219	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
219	1	2,4-Dinitrotoluene	3.60E-01	mg/kg		5.63E-01	NoA
219	1	2,6-Dinitrotoluene	3.60E-01	mg/kg		3.26E+00	NoA
219	1	2-Chloronaphthalene	3.60E-01	mg/kg		6.26E+02	NoA
219	1	2-Chlorophenol	3.60E-01	mg/kg		3.91E+01	NoA
219	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
219	1	2-Methylnaphthalene	3.60E-01	mg/kg		1.30E+01	NoA
219	1	2-Methylphenol	3.60E-01	mg/kg		1.54E+02	NoA
219	1	2-Nitrobenzamine	1.80E+00	mg/kg		2.96E-01	Yes
219	1	2-Nitrophenol	3.60E-01	mg/kg			NoC
219	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
219	1	3-Nitrobenzamine	1.80E+00	mg/kg		9.78E-01	Yes
219	1	4-Bromophenyl phenyl ether	3.60E-01	mg/kg			NoC
219	1	4-Chloro-3-methylphenol	3.60E-01	mg/kg			NoC
219	1	4-Chlorobenzamine	3.60E-01	mg/kg		8.66E-01	NoA
219	1	4-Chlorophenyl phenyl ether	3.60E-01	mg/kg			NoC
219	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
219	1	Acenaphthene	3.60E-01	mg/kg		1.17E+02	NoA
219	1	Acenaphthylene	3.60E-01	mg/kg			NoC
219	1	Anthracene	3.60E-01	mg/kg		7.47E+02	NoA
219	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
219	1	Benzenemethanol	3.60E-01	mg/kg		3.26E+02	NoA
219	1	Benzo(ghi)perylene	3.60E-01	mg/kg			NoC
219	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
219	1	Bis(2-chloroethoxy)methane	3.60E-01	mg/kg		9.78E+00	NoA
219	1	Bis(2-chloroethyl) ether	7.30E-03	mg/kg		2.14E-01	NoA
219	1	Bis(2-chloroisopropyl) ether	3.60E-01	mg/kg		4.57E+00	NoA
219	1	Bis(2-ethylhexyl)phthalate	3.60E-01	mg/kg		1.25E+01	NoA
219	1	Butyl benzyl phthalate	3.60E-01	mg/kg		9.18E+01	NoA
219	1	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
219	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
219	1	Dibenzofuran	3.60E-01	mg/kg		3.26E+00	NoA
219	1	Diethyl phthalate	3.60E-01	mg/kg		2.61E+03	NoA
219	1	Dimethyl phthalate	3.60E-01	mg/kg			NoC
219	1	Di-n-butyl phthalate	3.60E-01	mg/kg		3.26E+02	NoA
219	1	Di-n-octylphthalate	3.60E-01	mg/kg		1.30E+02	NoA
219	1	Fluorene	3.60E-01	mg/kg		9.15E+01	NoA
219	1	Hexachlorobenzene	3.60E-01	mg/kg		4.92E-02	Yes
219	1	Hexachlorobutadiene	3.60E-01	mg/kg		2.22E+00	NoA
219	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
219	1	Hexachloroethane	3.60E-01	mg/kg		2.28E+00	NoA
219	1	Isophorone	3.60E-01	mg/kg		1.82E+02	NoA
219	1	m,p-Cresol	7.30E-01	mg/kg		3.91E+01	NoA
219	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
219	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
219	1	Naphthalene	3.60E-01	mg/kg		1.15E+00	NoA
219	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
219	1	N-Nitroso-di-n-propylamine	7.30E-03	mg/kg		1.89E-02	NoA
219	1	N-Nitrosodiphenylamine	3.60E-01	mg/kg		3.22E+01	NoA
219	1	PCB, Total	5.00E+00	mg/kg		6.48E-02	Yes
219	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
219	1	Phenol	3.60E-01	mg/kg		4.98E+02	NoA
219	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
219	1	Pyridine	7.30E-01	mg/kg		7.82E+00	NoA
219	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
219	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes
219	1	Uranium	2.00E+01	mg/kg	4.90E+00	1.38E+01	Yes
488	1	1,2,4-Trichlorobenzene	3.70E-01	mg/kg		7.86E-01	NoA
488	1	1,2-Dichlorobenzene	3.70E-01	mg/kg		2.92E+01	NoA
488	1	1,3-Dichlorobenzene	3.70E-01	mg/kg			NoC
488	1	1,4-Dichlorobenzene	3.70E-01	mg/kg		8.13E-01	NoA
488	1	2,4,5-Trichlorophenol	3.70E-01	mg/kg		3.26E+02	NoA
488	1	2,4,6-Trichlorophenol	3.70E-01	mg/kg		3.26E+00	NoA
488	1	2,4-Dichlorophenol	3.70E-01	mg/kg		9.78E+00	NoA
488	1	2,4-Dimethylphenol	3.70E-01	mg/kg		6.52E+01	NoA
488	1	2,4-Dinitrophenol	1.80E+00	mg/kg		6.52E+00	NoA
488	1	2,4-Dinitrotoluene	3.70E-01	mg/kg		5.63E-01	NoA
488	1	2,6-Dinitrotoluene	3.70E-01	mg/kg		3.26E+00	NoA
488	1	2-Chloronaphthalene	3.70E-01	mg/kg		6.26E+02	NoA
488	1	2-Chlorophenol	3.70E-01	mg/kg		3.91E+01	NoA
488	1	2-Methyl-4,6-dinitrophenol	1.80E+00	mg/kg		2.61E-01	Yes
488	1	2-Methylnaphthalene	3.70E-01	mg/kg		1.30E+01	NoA
488	1	2-Methylphenol	3.70E-01	mg/kg		1.54E+02	NoA
488	1	2-Nitrobenzenamine	1.80E+00	mg/kg		2.96E-01	Yes
488	1	2-Nitrophenol	3.70E-01	mg/kg			NoC
488	1	3,3'-Dichlorobenzidine	1.80E+00	mg/kg		3.85E-01	Yes
488	1	3-Nitrobenzenamine	1.80E+00	mg/kg		9.78E-01	Yes
488	1	4-Bromophenyl phenyl ether	3.70E-01	mg/kg			NoC
488	1	4-Chloro-3-methylphenol	3.70E-01	mg/kg			NoC
488	1	4-Chlorobenzenamine	3.70E-01	mg/kg		8.66E-01	NoA
488	1	4-Chlorophenyl phenyl ether	3.70E-01	mg/kg			NoC
488	1	4-Nitrophenol	1.80E+00	mg/kg			NoC
488	1	Acenaphthylene	3.70E-01	mg/kg			NoC
488	1	Arsenic	1.10E+01	mg/kg	1.20E+01	2.38E-01	NoB
488	1	Benzenemethanol	3.70E-01	mg/kg		3.26E+02	NoA
488	1	Benzoic acid	1.80E+00	mg/kg		1.30E+04	NoA
488	1	Bis(2-chloroethoxy)methane	3.70E-01	mg/kg		9.78E+00	NoA
488	1	Bis(2-chloroethyl) ether	7.40E-03	mg/kg		2.14E-01	NoA
488	1	Bis(2-chloroisopropyl) ether	3.70E-01	mg/kg		4.57E+00	NoA
488	1	Butyl benzyl phthalate	3.70E-01	mg/kg		9.18E+01	NoA
488	1	Chromium	8.50E+01	mg/kg	1.60E+01	1.56E+01	Yes
488	1	Copper	3.50E+01	mg/kg	1.90E+01	1.84E+02	NoA
488	1	Dibenzofuran	3.70E-01	mg/kg		3.26E+00	NoA
488	1	Diethyl phthalate	3.70E-01	mg/kg		2.61E+03	NoA
488	1	Dimethyl phthalate	3.70E-01	mg/kg			NoC
488	1	Di-n-butyl phthalate	3.70E-01	mg/kg		3.26E+02	NoA

A = <Child Resident NAL C = no NAL available
 B = <Background E = essential nutrient

Table D7.1. Surface Soil COPCs for Nondetected Analyses (Continued)

SWM U	EU	Chemical	Maximum Nondetect Concentration	Units	Surface Background Concentration	Child Resident NAL	COPC?
488	1	Di-n-octylphthalate	3.70E-01	mg/kg		1.30E+02	NoA
488	1	Fluorene	3.70E-01	mg/kg		9.15E+01	NoA
488	1	Hexachlorobenzene	3.70E-01	mg/kg		4.92E-02	Yes
488	1	Hexachlorobutadiene	3.70E-01	mg/kg		2.22E+00	NoA
488	1	Hexachlorocyclopentadiene	1.80E+00	mg/kg		1.95E+01	NoA
488	1	Hexachloroethane	3.70E-01	mg/kg		2.28E+00	NoA
488	1	Isophorone	3.70E-01	mg/kg		1.82E+02	NoA
488	1	Lead	1.30E+01	mg/kg	3.60E+01	4.00E+02	NoAB
488	1	m,p-Cresol	7.40E-01	mg/kg		3.91E+01	NoA
488	1	Mercury	1.00E+01	mg/kg	2.00E-01	2.13E-01	Yes
488	1	Molybdenum	1.50E+01	mg/kg		2.30E+01	NoA
488	1	Naphthalene	3.70E-01	mg/kg		1.15E+00	NoA
488	1	Nickel	6.50E+01	mg/kg	2.10E+01	1.04E+01	Yes
488	1	Nitrobenzene	1.80E+00	mg/kg		4.79E+00	NoA
488	1	N-Nitroso-di-n-propylamine	7.40E-03	mg/kg		1.89E-02	NoA
488	1	N-Nitrosodiphenylamine	3.70E-01	mg/kg		3.22E+01	NoA
488	1	Pentachlorophenol	1.80E+00	mg/kg		4.36E-01	Yes
488	1	Phenol	3.70E-01	mg/kg		4.98E+02	NoA
488	1	p-Nitroaniline	1.80E+00	mg/kg		8.66E+00	NoA
488	1	Pyridine	7.40E-01	mg/kg		7.82E+00	NoA
488	1	Selenium	2.00E+01	mg/kg	8.00E-01	2.30E+01	NoA
488	1	Silver	1.00E+01	mg/kg	2.30E+00	2.61E+00	Yes

Table D7.2. Toxicity Values and Information Used in Soils OU Uncertainty Analysis

Chemical Abstract Number	Analyte	GI Absorption Factor (Unitless)	Oral RfD (RfDo)	Absorbed Dose (RfDd)	Inhalation (RfCi)	Inhalation (RfDi)	Oral Slope Factor (SfO)	Absorbed Dose Slope Factor (SfD)	Inhalation Slope Factor (SfI)	PEF Ind./Comm.	RAGS Part E ABS (Unitless)	Permeability Constant
96184	1,2,3-Trichloropropane	1.00E+00	4.00E-03	4.00E-03	3.00E-04	8.57E-05	3.00E+01	3.00E+01		6.20E+08	0.00E+00	9.60E-03
120821	1,2,4-Trichlorobenzene	1.00E+00	1.00E-02	1.00E-02	2.00E-03	5.71E-04	2.90E-02	2.90E-02		6.20E+08	0.00E+00	7.05E-02
107062	1,2-Dichloroethane	1.00E+00	6.00E-03	6.00E-03	7.00E-03	2.00E-03	9.10E-02	9.10E-02	9.10E-05	6.20E+08	0.00E+00	
106467	1,4-Dichlorobenzene	1.00E+00	7.00E-02	7.00E-02	8.00E-01	2.29E-01	5.40E-03	5.40E-03	3.85E-05	6.20E+08	0.00E+00	
121142	2,4-Dinitrotoluene	1.00E+00	2.00E-03	2.00E-03			3.10E-01	3.10E-01	3.12E-04	6.20E+08	1.02E-01	
	2-Methyl-4,6-dinitrophenol						not available					
	2-Nitrobenzenamine						not available					
91941	3,3'-Dichlorobenzidine	1.00E+00					4.50E-01	4.50E-01	1.19E-03		1.00E-01	
	3-Nitrobenzenamine						not available					
	4-Chlorobenzenamine						not available					
111444	Bis(2-chloroethyl) ether	1.00E+00					1.10E+00	1.10E+00	1.16E-03		0.00E+00	
87683	Hexachlorobutadiene	1.00E+00	1.00E-03	1.00E-03			7.80E-02	7.80E-02	7.70E-05		1.00E-01	
67721	Hexachloroethane	1.00E+00	7.00E-04	7.00E-04	3.00E-02	8.57E-03	4.00E-02	4.00E-02	3.85E-05		1.00E-01	
621647	N-Nitroso-di-n-propylamine	1.00E+00					7.00E+00	7.00E+00	7.00E-03		1.00E-01	
110576	Trans-1,4-Dichloro-2-butene	1.00E+00							1.47E-02		1.00E-01	

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
5	1	1	Surface	3,3'-Dichlorobenzidine	mg/kg	8.90E-01	2.44E-08	2.29E-07	1.57E-11
5	1	1	Surface	Antimony	mg/kg	9.65E+00	2.64E-07	1.24E-06	1.71E-10
5	1	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.40E-01	1.21E-08	0.00E+00	7.78E-12
5	1	1	Surface	Hexachlorobenzene	mg/kg	4.40E-01	1.21E-08	1.13E-07	2.42E-07
5	1	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.40E-01	1.21E-08	1.13E-07	7.78E-12
5	1	1	Surface	Pentachlorophenol	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
5	1	1	Surface	Silver	mg/kg	3.20E+00	8.77E-08	3.30E-07	5.66E-11
5	1	1	Surface	Thallium	mg/kg	1.93E+01	5.29E-07	2.49E-06	3.41E-10
5	1	1	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
5	1	2	Surface	3,3'-Dichlorobenzidine	mg/kg	9.30E-01	2.55E-08	2.40E-07	1.64E-11
5	1	2	Surface	Bis(2-chloroethyl) ether	mg/kg	4.60E-01	1.26E-08	0.00E+00	8.13E-12
5	1	2	Surface	Hexachlorobenzene	mg/kg	4.60E-01	1.26E-08	1.18E-07	2.53E-07
5	1	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.60E-01	1.26E-08	1.18E-07	8.13E-12
5	1	2	Surface	Pentachlorophenol	mg/kg	2.30E+00	6.30E-08	5.92E-07	4.07E-11
5	1	2	Surface	Total PAH	mg/kg	4.60E-01	1.26E-08	1.54E-07	6.01E-10
5	1	3	Surface	1,4-Dichlorobenzene	mg/kg	2.30E+00	6.30E-08	0.00E+00	4.07E-11
5	1	3	Surface	Antimony	mg/kg	1.50E+01	4.11E-07	1.93E-06	2.65E-10
5	1	3	Surface	Bis(2-chloroethyl) ether	mg/kg	3.30E-01	9.04E-09	0.00E+00	5.83E-12
5	1	3	Surface	Cadmium	mg/kg	3.00E+00	8.22E-08	7.73E-09	5.30E-11
5	1	3	Surface	Hexachlorobenzene	mg/kg	2.30E+00	6.30E-08	5.92E-07	1.27E-06
5	1	3	Surface	Hexachlorobutadiene	mg/kg	2.30E+00	6.30E-08	5.92E-07	4.07E-11
5	1	3	Surface	Hexachloroethane	mg/kg	2.30E+00	6.30E-08	5.92E-07	4.07E-11
5	1	3	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.30E-01	9.04E-09	8.50E-08	5.83E-12
5	1	3	Surface	Pentachlorophenol	mg/kg	2.30E+00	6.30E-08	5.92E-07	4.07E-11
5	1	3	Surface	Silver	mg/kg	4.00E+00	1.10E-07	4.12E-07	7.07E-11
5	1	3	Surface	Thallium	mg/kg	2.50E+01	6.85E-07	3.22E-06	4.42E-10
5	1	3	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
5	1	4	Surface	3,3'-Dichlorobenzidine	mg/kg	7.80E-01	2.14E-08	2.01E-07	1.38E-11
5	1	4	Surface	Antimony	mg/kg	1.22E+01	3.34E-07	1.57E-06	2.16E-10
5	1	4	Surface	Bis(2-chloroethyl) ether	mg/kg	3.90E-01	1.07E-08	0.00E+00	6.89E-12
5	1	4	Surface	Cadmium	mg/kg	1.80E+00	4.93E-08	4.64E-09	3.18E-11
5	1	4	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
5	1	4	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.90E-01	1.07E-08	1.00E-07	6.89E-12
5	1	4	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	1	4	Surface	Thallium	mg/kg	1.80E+01	4.93E-07	2.32E-06	3.18E-10
5	1	4	Surface	Total PAH	mg/kg	4.80E-01	1.32E-08	1.61E-07	6.27E-10
5	1	5	Surface	3,3'-Dichlorobenzidine	mg/kg	8.20E-01	2.25E-08	2.11E-07	1.45E-11
5	1	5	Surface	Antimony	mg/kg	9.75E+00	2.67E-07	1.26E-06	1.72E-10
5	1	5	Surface	Bis(2-chloroethyl) ether	mg/kg	4.10E-01	1.12E-08	0.00E+00	7.25E-12
5	1	5	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	1	5	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.10E-01	1.12E-08	1.06E-07	7.25E-12
5	1	5	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
5	1	5	Surface	Thallium	mg/kg	1.95E+01	5.34E-07	2.51E-06	3.45E-10
5	99	1	Surface	Antimony	mg/kg	9.72E+00	2.66E-07	1.25E-06	1.72E-10
5	99	1	Surface	Cadmium	mg/kg	1.94E+00	5.32E-08	5.00E-09	3.43E-11
5	99	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	99	1	Surface	Thallium	mg/kg	1.94E+01	5.32E-07	2.50E-06	3.43E-10
5	99	1	Surface	Total PAH	mg/kg	4.80E-01	1.32E-08	1.61E-07	6.27E-10
5	99	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
5	194	1	Surface	Hexachlorobenzene	mg/kg	4.30E-01	1.18E-08	1.11E-07	2.37E-07
5	194	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
5	194	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	2	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
5	194	2	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	2	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	2	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	2	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	3	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	3	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	194	3	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	3	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	3	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	3	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	3	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	4	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	4	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	194	4	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	4	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	4	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	5	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	5	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	194	5	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	5	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	5	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	6	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	6	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
5	194	6	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	6	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	6	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	6	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	7	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	7	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
5	194	7	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	7	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	7	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	7	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	8	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	8	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
5	194	8	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	8	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	8	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	8	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	8	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	8	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	9	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	9	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
5	194	9	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
5	194	9	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	9	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	9	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	9	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	9	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	10	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	10	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
5	194	10	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	10	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	10	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	10	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	10	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	11	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	194	11	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
5	194	11	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	194	11	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	12	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	194	12	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
5	194	12	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	12	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	12	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	194	12	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	13	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	13	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
5	194	13	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	13	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	13	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	13	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	13	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	14	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	14	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
5	194	14	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	14	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	14	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	14	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	14	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	15	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	15	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	15	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	15	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	16	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	16	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	194	16	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	16	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	16	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	16	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	16	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	17	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	194	17	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
5	194	17	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
5	194	17	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	17	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	17	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	194	17	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	17	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	18	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	18	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
5	194	18	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	18	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	18	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	18	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	18	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	19	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
5	194	19	Surface	Hexachlorobenzene	mg/kg	4.40E-01	1.21E-08	1.13E-07	2.42E-07
5	194	19	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	19	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	19	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
5	194	19	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	19	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	20	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	20	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
5	194	20	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	20	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	20	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	21	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	21	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
5	194	21	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	21	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	21	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	21	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	22	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	22	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
5	194	22	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	22	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	22	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	22	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	22	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	23	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	23	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	194	23	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	23	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	23	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	23	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	24	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
5	194	24	Surface	Hexachlorobenzene	mg/kg	4.40E-01	1.21E-08	1.13E-07	2.42E-07
5	194	24	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	24	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	24	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
5	194	24	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	24	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
5	194	25	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	25	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
5	194	25	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	25	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	25	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	25	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	194	25	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	26	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	26	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
5	194	26	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	26	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
5	194	26	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	26	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	26	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	27	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	27	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
5	194	27	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	27	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	27	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	27	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	28	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	28	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
5	194	28	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	28	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	28	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
5	194	28	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	29	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
5	194	29	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
5	194	29	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	194	29	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	29	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
5	194	29	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	30	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	30	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
5	194	30	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	194	30	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
5	194	30	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	31	Surface	3,3'-Dichlorobenzidine	mg/kg	4.70E-01	1.29E-08	1.21E-07	8.31E-12
5	194	31	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	31	Surface	Bis(2-chloroethyl) ether	mg/kg	4.70E-01	1.29E-08	0.00E+00	8.31E-12
5	194	31	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
5	194	31	Surface	Hexachlorobenzene	mg/kg	4.70E-01	1.29E-08	1.21E-07	2.59E-07
5	194	31	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.70E-01	1.29E-08	1.21E-07	8.31E-12
5	194	31	Surface	PCB, Total	mg/kg	1.00E-01	2.74E-09	3.61E-08	2.98E-09
5	194	31	Surface	Pentachlorophenol	mg/kg	4.70E-01	1.29E-08	1.21E-07	8.31E-12
5	194	31	Surface	Silver	mg/kg	4.00E+00	1.10E-07	4.12E-07	7.07E-11
5	194	31	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	194	31	Surface	Total PAH	mg/kg	4.70E-01	1.29E-08	1.57E-07	6.14E-10
5	196	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
5	196	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
5	196	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	196	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	196	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
5	196	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	196	2	Surface	Benzene	mg/kg	1.00E+00	2.74E-08	6.44E-07	6.89E-06
5	196	2	Surface	Silver	mg/kg	3.00E+00	8.22E-08	3.09E-07	5.30E-11
5	489	1	Surface	1,2,3-Trichloropropane	mg/kg	5.70E-03	1.56E-10	0.00E+00	1.01E-13
5	489	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
5	489	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
5	489	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	489	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	489	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
5	489	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
5	489	1	Surface	Trans-1,4-Dichloro-2-butene	mg/kg	1.10E-02	3.01E-10	2.83E-09	1.94E-13
5	489	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
5	531	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	531	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
5	531	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
5	531	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
5	531	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
5	531	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	200	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	200	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
6	200	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	200	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	212	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	212	1	Surface	Antimony	mg/kg	9.74E+00	2.67E-07	1.25E-06	1.72E-10
6	212	1	Surface	Bis(2-chloroethyl) ether	mg/kg	3.30E-01	9.04E-09	0.00E+00	5.83E-12
6	212	1	Surface	Cadmium	mg/kg	1.95E+00	5.34E-08	5.02E-09	3.45E-11
6	212	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
6	212	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	212	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.30E-01	9.04E-09	8.50E-08	5.83E-12
6	212	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	212	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	212	1	Surface	Thallium	mg/kg	1.95E+01	5.34E-07	2.51E-06	3.45E-10
6	212	1	Surface	Total PAH	mg/kg	4.90E-01	1.34E-08	1.64E-07	6.40E-10
6	213	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	213	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
6	213	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	213	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	213	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	213	2	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	213	2	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
6	213	2	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	214	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	214	1	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
6	214	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
6	214	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	214	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
6	214	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
6	214	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	214	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	214	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	215	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	215	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
6	215	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	215	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
6	215	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	215	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	215	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	216	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	216	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
6	216	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	216	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
6	216	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
6	216	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	216	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	217	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	217	1	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
6	217	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	217	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
6	217	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	217	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	217	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	217	2	Surface	Bis(2-chloroethyl) ether	mg/kg	3.70E-01	1.01E-08	0.00E+00	6.54E-12
6	217	2	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
6	217	2	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
6	217	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.70E-01	1.01E-08	9.53E-08	6.54E-12
6	217	2	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
6	217	2	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
6	217	2	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	217	2	Surface	Uranium	mg/kg	2.00E+02	5.48E-06	2.58E-05	3.54E-09
6	221	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	221	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
6	221	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	221	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	221	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	222	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
6	222	1	Surface	Antimony	mg/kg	7.00E-01	1.92E-08	9.01E-08	1.24E-11
6	222	1	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
6	222	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	222	1	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
6	222	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	227	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	227	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	227	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	1.37E-08	0.00E+00	8.84E-12
6	227	1	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
6	227	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
6	227	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
6	227	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
6	227	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	227	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	227	1	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	227	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	227	2	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	227	2	Surface	Bis(2-chloroethyl) ether	mg/kg	4.80E-01	1.32E-08	0.00E+00	8.48E-12
6	227	2	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
6	227	2	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
6	227	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.80E-01	1.32E-08	1.24E-07	8.48E-12
6	227	2	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
6	227	2	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
6	227	2	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
6	228	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.60E+00	4.38E-08	4.12E-07	2.83E-11
6	228	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
6	228	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
6	228	1	Surface	Pentachlorophenol	mg/kg	1.60E+00	4.38E-08	4.12E-07	2.83E-11
7	76	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
7	76	1	Surface	Antimony	mg/kg	5.70E-01	1.56E-08	7.34E-08	1.01E-11
7	76	1	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
7	76	1	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
7	76	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
7	76	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
7	76	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
7	76	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
7	76	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
7	165	1	Surface	1,1-Dichloroethene	mg/kg	6.10E-01	1.67E-08	3.93E-07	9.77E-06
7	165	1	Surface	1,2-Dichloroethane	mg/kg	6.10E-01	1.67E-08	0.00E+00	1.08E-11
7	165	1	Surface	3,3'-Dichlorobenzidine	mg/kg	7.50E-01	2.05E-08	1.93E-07	1.33E-11
7	165	1	Surface	Benzene	mg/kg	6.10E-01	1.67E-08	3.93E-07	4.20E-06
7	165	1	Surface	Bis(2-chloroethyl) ether	mg/kg	3.70E-01	1.01E-08	0.00E+00	6.54E-12
7	165	1	Surface	Cadmium	mg/kg	5.00E+00	1.37E-07	1.29E-08	8.84E-11
7	165	1	Surface	Carbon tetrachloride	mg/kg	6.10E-01	1.67E-08	3.93E-07	7.80E-06
7	165	1	Surface	Chloroform	mg/kg	6.10E-01	1.67E-08	3.93E-07	4.77E-06
7	165	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
7	165	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.70E-01	1.01E-08	9.53E-08	6.54E-12
7	165	1	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
7	165	1	Surface	Tetrachloroethene	mg/kg	6.10E-01	1.67E-08	3.93E-07	5.71E-06
7	165	1	Surface	Thallium	mg/kg	1.96E+01	5.37E-07	2.52E-06	3.46E-10
7	165	1	Surface	Trichloroethene	mg/kg	6.10E-01	1.67E-08	3.93E-07	5.92E-06
7	170	1	Surface	PCB, Total	mg/kg	1.00E-01	2.74E-09	3.61E-08	2.98E-09
8	158	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
8	158	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
8	158	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
8	158	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
8	158	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
8	169	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
8	169	1	Surface	Cadmium	mg/kg	1.10E+00	3.01E-08	2.83E-09	1.94E-11
8	169	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
8	169	1	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
8	169	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
9	19	1	Surface	Antimony	mg/kg	9.81E+01	2.69E-06	1.26E-05	1.73E-09
9	19	1	Surface	Chromium	mg/kg	2.96E+01	8.11E-07	3.81E-06	5.23E-10
9	19	1	Surface	Cobalt	mg/kg	4.76E+01	1.30E-06	6.13E-06	8.41E-10
9	19	1	Surface	Silver	mg/kg	9.90E+00	2.71E-07	1.02E-06	1.75E-10
9	138	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	138	1	Surface	Hexachlorobenzene	mg/kg	4.30E-01	1.18E-08	1.11E-07	2.37E-07
9	138	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	138	1	Surface	Thallium	mg/kg	5.00E+00	1.37E-07	6.44E-07	8.84E-11
9	138	1	Surface	Trichloroethene	mg/kg	1.00E+00	2.74E-08	6.44E-07	9.70E-06
9	138	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	138	2	Surface	1,1-Dichloroethene	mg/kg	1.00E+00	2.74E-08	6.44E-07	1.60E-05
9	138	2	Surface	1,2-Dichloroethane	mg/kg	1.00E+00	2.74E-08	0.00E+00	1.77E-11
9	138	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
9	138	2	Surface	Benzene	mg/kg	1.00E+00	2.74E-08	6.44E-07	6.89E-06
9	138	2	Surface	Carbon tetrachloride	mg/kg	1.00E+00	2.74E-08	6.44E-07	1.28E-05
9	138	2	Surface	Chloroform	mg/kg	1.00E+00	2.74E-08	6.44E-07	7.83E-06
9	138	2	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
9	138	2	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
9	138	2	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	138	2	Surface	Naphthalene	mg/kg	2.50E+00	6.85E-08	1.61E-06	1.47E-06
9	138	2	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
9	138	2	Surface	Tetrachloroethene	mg/kg	1.00E+00	2.74E-08	6.44E-07	9.37E-06
9	138	2	Surface	Trichloroethene	mg/kg	1.00E+00	2.74E-08	6.44E-07	9.70E-06
9	138	2	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	138	2	Surface	Vinyl chloride	mg/kg	1.10E+00	3.01E-08	7.08E-07	2.05E-05
9	180	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	180	1	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
9	180	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	180	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	180	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	180	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	180	2	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	180	2	Surface	Hexachlorobenzene	mg/kg	4.40E-01	1.21E-08	1.13E-07	2.42E-07
9	180	2	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	180	2	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	180	2	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	180	2	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	180	2	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	180	3	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	180	3	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
9	180	3	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	180	3	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	180	3	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	180	3	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	180	4	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	180	4	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
9	180	4	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	180	4	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	180	4	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	180	4	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
9	181	1	Surface	Antimony	mg/kg	8.34E+00	2.28E-07	1.07E-06	1.47E-10
9	181	1	Surface	Cadmium	mg/kg	2.49E+00	6.82E-08	6.41E-09	4.40E-11
9	181	1	Surface	PCB, Total	mg/kg	1.30E-01	3.56E-09	4.69E-08	3.87E-09
9	195	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	1	Surface	Hexachlorobenzene	mg/kg	4.50E-01	1.23E-08	1.16E-07	2.48E-07
9	195	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	1	Surface	Pentachlorophenol	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	2	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	2	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
9	195	2	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	2	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
9	195	2	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	2	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	2	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	3	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	3	Surface	Hexachlorobenzene	mg/kg	4.30E-01	1.18E-08	1.11E-07	2.37E-07
9	195	3	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	3	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	3	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	3	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	3	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	4	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	4	Surface	Hexachlorobenzene	mg/kg	4.50E-01	1.23E-08	1.16E-07	2.48E-07
9	195	4	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	4	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	4	Surface	Pentachlorophenol	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	4	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	4	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	5	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	5	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
9	195	5	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	5	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	5	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	5	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	5	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	6	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	6	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
9	195	6	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	6	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	6	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	6	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	6	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	7	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	7	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
9	195	7	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	7	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
9	195	7	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	7	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
9	195	7	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	8	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	8	Surface	Hexachlorobenzene	mg/kg	4.40E-01	1.21E-08	1.13E-07	2.42E-07
9	195	8	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	8	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	8	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	8	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	8	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	9	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	9	Surface	Hexachlorobenzene	mg/kg	4.60E-01	1.26E-08	1.18E-07	2.53E-07
9	195	9	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	9	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	9	Surface	Pentachlorophenol	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	9	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	9	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	10	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	10	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
9	195	10	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	10	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	10	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	10	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	11	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	11	Surface	Hexachlorobenzene	mg/kg	4.30E-01	1.18E-08	1.11E-07	2.37E-07
9	195	11	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	11	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	11	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	11	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	11	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	12	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	12	Surface	Hexachlorobenzene	mg/kg	4.30E-01	1.18E-08	1.11E-07	2.37E-07
9	195	12	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	12	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	12	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	195	12	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	12	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	13	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	195	13	Surface	Hexachlorobenzene	mg/kg	3.90E-01	1.07E-08	1.00E-07	2.15E-07
9	195	13	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	13	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	13	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	195	13	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	13	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	14	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	14	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
9	195	14	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	14	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	14	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	14	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	14	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	15	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
9	195	15	Surface	Hexachlorobenzene	mg/kg	4.50E-01	1.23E-08	1.16E-07	2.48E-07
9	195	15	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	15	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
9	195	15	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	15	Surface	Pentachlorophenol	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	195	15	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	15	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	16	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	195	16	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
9	195	16	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
9	195	16	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
9	195	16	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
9	195	16	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
9	195	16	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	195	17	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	17	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
9	195	17	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	195	17	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	492	1	Surface	3,3'-Dichlorobenzidine	mg/kg	8.20E-01	2.25E-08	2.11E-07	1.45E-11
9	492	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	492	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.10E-01	1.12E-08	0.00E+00	7.25E-12
9	492	1	Surface	Hexachlorobenzene	mg/kg	4.10E-01	1.12E-08	1.06E-07	2.26E-07
9	492	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.10E-01	1.12E-08	1.06E-07	7.25E-12
9	492	1	Surface	Pentachlorophenol	mg/kg	2.00E+00	5.48E-08	5.15E-07	3.54E-11
9	492	1	Surface	Silver	mg/kg	4.00E+00	1.10E-07	4.12E-07	7.07E-11
9	492	1	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	492	1	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	493	1	Surface	3,3'-Dichlorobenzidine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
9	493	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	493	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	1.37E-08	0.00E+00	8.84E-12
9	493	1	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
9	493	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
9	493	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
9	493	1	Surface	Pentachlorophenol	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
9	493	1	Surface	Silver	mg/kg	4.00E+00	1.10E-07	4.12E-07	7.07E-11
9	493	1	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	493	1	Surface	Uranium	mg/kg	2.00E+03	5.48E-05	2.58E-04	3.54E-08
9	517	1	Surface	3,3'-Dichlorobenzidine	mg/kg	4.90E-01	1.34E-08	1.26E-07	8.66E-12
9	517	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	517	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.90E-01	1.34E-08	0.00E+00	8.66E-12
9	517	1	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
9	517	1	Surface	Hexachlorobenzene	mg/kg	4.90E-01	1.34E-08	1.26E-07	2.70E-07
9	517	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.90E-01	1.34E-08	1.26E-07	8.66E-12
9	517	1	Surface	Pentachlorophenol	mg/kg	4.90E-01	1.34E-08	1.26E-07	8.66E-12
9	517	1	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	517	1	Surface	Total PAH	mg/kg	4.90E-01	1.34E-08	1.64E-07	6.40E-10
9	517	1	Surface	Uranium	mg/kg	1.00E+02	2.74E-06	1.29E-05	1.77E-09
9	541	1	Surface	3,3'-Dichlorobenzidine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
9	541	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	541	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	1.37E-08	0.00E+00	8.84E-12

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
9	541	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
9	541	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
9	541	1	Surface	Pentachlorophenol	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
9	541	1	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
9	561	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	561	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.40E-01	1.21E-08	0.00E+00	7.78E-12
9	561	1	Surface	Cadmium	mg/kg	1.83E+00	5.01E-08	4.71E-09	3.23E-11
9	561	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
9	561	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.40E-01	1.21E-08	1.13E-07	7.78E-12
9	561	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
9	561	2	Surface	1,2,3-Trichloropropane	mg/kg	5.90E-03	1.62E-10	0.00E+00	1.04E-13
9	561	2	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	561	2	Surface	Bis(2-chloroethyl) ether	mg/kg	4.40E-01	1.21E-08	0.00E+00	7.78E-12
9	561	2	Surface	Hexachlorobenzene	mg/kg	4.90E-01	1.34E-08	1.26E-07	2.70E-07
9	561	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.40E-01	1.21E-08	1.13E-07	7.78E-12
9	561	2	Surface	Pentachlorophenol	mg/kg	2.20E+00	6.03E-08	5.67E-07	3.89E-11
9	561	2	Surface	Trans-1,4-Dichloro-2-butene	mg/kg	1.20E-02	3.29E-10	3.09E-09	2.12E-13
9	562	1	Surface	Antimony	mg/kg	8.20E+00	2.25E-07	1.06E-06	1.45E-10
9	562	1	Surface	Chromium	mg/kg	6.50E+01	1.78E-06	8.37E-06	1.15E-09
9	562	1	Surface	PCB, Total	mg/kg	1.00E+00	2.74E-08	3.61E-07	2.98E-08
9	562	1	Surface	Thallium	mg/kg	1.95E+00	5.34E-08	2.51E-07	3.45E-11
9	562	1	Surface	Total PAH	mg/kg	4.90E-01	1.34E-08	1.64E-07	6.40E-10
9	562	2	Surface	Antimony	mg/kg	8.30E+00	2.27E-07	1.07E-06	1.47E-10
9	562	2	Surface	Chromium	mg/kg	6.50E+01	1.78E-06	8.37E-06	1.15E-09
9	562	2	Surface	Thallium	mg/kg	1.93E+00	5.29E-08	2.49E-07	3.41E-11
9	562	2	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	562	3	Surface	Antimony	mg/kg	7.72E+00	2.12E-07	9.94E-07	1.36E-10
9	562	3	Surface	Thallium	mg/kg	1.79E+00	4.90E-08	2.30E-07	3.16E-11
9	562	4	Surface	Antimony	mg/kg	8.13E+00	2.23E-07	1.05E-06	1.44E-10
9	562	4	Surface	PCB, Total	mg/kg	1.00E+00	2.74E-08	3.61E-07	2.98E-08
9	562	4	Surface	Thallium	mg/kg	1.93E+00	5.29E-08	2.49E-07	3.41E-11
9	562	4	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	562	5	Surface	Antimony	mg/kg	9.53E+00	2.61E-07	1.23E-06	1.68E-10
9	562	5	Surface	Thallium	mg/kg	1.97E+00	5.40E-08	2.54E-07	3.48E-11
9	563	1	Surface	Antimony	mg/kg	8.26E+00	2.26E-07	1.06E-06	1.46E-10
9	563	1	Surface	Thallium	mg/kg	1.96E+00	5.37E-08	2.52E-07	3.46E-11
9	563	1	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	563	2	Surface	Antimony	mg/kg	7.85E+00	2.15E-07	1.01E-06	1.39E-10
9	563	2	Surface	Chromium	mg/kg	6.50E+01	1.78E-06	8.37E-06	1.15E-09
9	563	2	Surface	PCB, Total	mg/kg	1.00E+00	2.74E-08	3.61E-07	2.98E-08
9	563	2	Surface	Thallium	mg/kg	1.87E+00	5.12E-08	2.41E-07	3.31E-11
9	563	2	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	564	1	Surface	Antimony	mg/kg	8.83E+00	2.42E-07	1.14E-06	1.56E-10
9	564	1	Surface	Total PAH	mg/kg	4.90E-01	1.34E-08	1.64E-07	6.40E-10
9	567	1	Surface	Antimony	mg/kg	7.91E+00	2.17E-07	1.02E-06	1.40E-10
9	567	1	Surface	Cadmium	mg/kg	2.35E+00	6.44E-08	6.05E-09	4.15E-11
9	567	1	Surface	PCB, Total	mg/kg	1.30E-01	3.56E-09	4.69E-08	3.87E-09
9	567	1	Surface	Thallium	mg/kg	9.38E+00	2.57E-07	1.21E-06	1.66E-10
9	567	1	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	567	2	Surface	1,1-Dichloroethene	mg/kg	4.00E-02	1.10E-09	2.58E-08	6.41E-07

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
9	567	3	Surface	Antimony	mg/kg	8.14E+00	2.23E-07	1.05E-06	1.44E-10
9	567	3	Surface	Cadmium	mg/kg	2.27E+00	6.22E-08	5.85E-09	4.01E-11
9	567	3	Surface	PCB, Total	mg/kg	1.30E-01	3.56E-09	4.69E-08	3.87E-09
9	567	3	Surface	Thallium	mg/kg	9.08E+00	2.49E-07	1.17E-06	1.60E-10
9	567	3	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
9	567	4	Surface	Antimony	mg/kg	8.18E+00	2.24E-07	1.05E-06	1.45E-10
9	567	4	Surface	Cadmium	mg/kg	2.48E+00	6.79E-08	6.39E-09	4.38E-11
9	567	4	Surface	PCB, Total	mg/kg	1.30E-01	3.56E-09	4.69E-08	3.87E-09
9	567	4	Surface	Thallium	mg/kg	9.93E+00	2.72E-07	1.28E-06	1.76E-10
9	567	4	Surface	Total PAH	mg/kg	5.00E-01	1.37E-08	1.67E-07	6.53E-10
10	14	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
10	14	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
10	14	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	2	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
10	14	2	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	2	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	14	3	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	3	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
10	14	3	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	3	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	14	4	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
10	14	4	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
10	14	4	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
10	14	5	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
10	14	5	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
10	14	5	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
10	14	6	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	6	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
10	14	6	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	7	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
10	14	7	Surface	Hexachlorobenzene	mg/kg	4.00E-01	1.10E-08	1.03E-07	2.20E-07
10	14	7	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
10	14	7	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	14	8	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	8	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
10	14	8	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	9	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	9	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
10	14	9	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	9	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	14	10	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	10	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
10	14	10	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	14	10	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	518	1	Surface	1,2,4-Trichlorobenzene	mg/kg	2.40E+00	6.58E-08	0.00E+00	4.24E-11
10	518	1	Surface	1,4-Dichlorobenzene	mg/kg	2.40E+00	6.58E-08	0.00E+00	4.24E-11
10	518	1	Surface	2,4-Dinitrotoluene	mg/kg	2.40E+00	6.58E-08	6.30E-07	4.24E-11
10	518	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.40E+00	6.58E-08	6.18E-07	4.24E-11

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
10	518	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
10	518	1	Surface	Bis(2-chloroethyl) ether	mg/kg	2.40E+00	6.58E-08	0.00E+00	4.24E-11
10	518	1	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
10	518	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
10	518	1	Surface	Hexachloroethane	mg/kg	2.40E+00	6.58E-08	6.18E-07	4.24E-11
10	518	1	Surface	Naphthalene	mg/kg	2.40E+00	6.58E-08	1.55E-06	1.41E-06
10	518	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	2.40E+00	6.58E-08	6.18E-07	4.24E-11
10	518	1	Surface	Pentachlorophenol	mg/kg	2.40E+00	6.58E-08	6.18E-07	4.24E-11
10	518	1	Surface	Silver	mg/kg	4.00E+00	1.10E-07	4.12E-07	7.07E-11
10	518	1	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
10	520	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.60E+00	4.38E-08	4.12E-07	2.83E-11
10	520	1	Surface	Antimony	mg/kg	9.30E+00	2.55E-07	1.20E-06	1.64E-10
10	520	1	Surface	Cadmium	mg/kg	1.86E+00	5.10E-08	4.79E-09	3.29E-11
10	520	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
10	520	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
10	520	1	Surface	Pentachlorophenol	mg/kg	1.60E+00	4.38E-08	4.12E-07	2.83E-11
10	520	1	Surface	Thallium	mg/kg	1.86E+01	5.10E-07	2.40E-06	3.29E-10
10	520	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.60E+00	4.38E-08	4.12E-07	2.83E-11
10	520	2	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
10	520	2	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	1.37E-08	0.00E+00	8.84E-12
10	520	2	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
10	520	2	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
10	520	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
10	520	2	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
10	520	2	Surface	Pentachlorophenol	mg/kg	1.60E+00	4.38E-08	4.12E-07	2.83E-11
10	520	2	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	520	2	Surface	Thallium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
10	520	3	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	520	3	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
10	520	3	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
10	520	3	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
10	520	3	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	520	4	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	520	4	Surface	Hexachlorobenzene	mg/kg	3.40E-01	9.32E-09	8.76E-08	1.87E-07
10	520	4	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
10	520	4	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
10	520	5	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
10	520	5	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
10	520	5	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
10	520	5	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
10	520	5	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
10	520	5	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
10	520	5	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
11	81	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
11	81	1	Surface	Antimony	mg/kg	1.31E+01	3.59E-07	1.69E-06	2.32E-10
11	81	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.20E-01	1.15E-08	0.00E+00	7.42E-12
11	81	1	Surface	Hexachlorobenzene	mg/kg	4.20E-01	1.15E-08	1.08E-07	2.31E-07
11	81	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.20E-01	1.15E-08	1.08E-07	7.42E-12
11	81	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	5.75E-08	5.41E-07	3.71E-11
11	81	1	Surface	Thallium	mg/kg	8.00E-01	2.19E-08	1.03E-07	1.41E-11

CDI = chronic daily intake
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
11	153	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
11	153	1	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
11	153	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
11	153	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
11	153	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
11	153	1	Surface	Pentachlorophenol	mg/kg	1.90E+00	5.21E-08	4.89E-07	3.36E-11
11	153	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
11	153	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
11	156	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
11	156	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	1.04E-08	9.79E-08	2.09E-07
11	156	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
11	156	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
11	160	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
11	160	1	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
11	160	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	9.59E-09	9.01E-08	1.93E-07
11	160	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
11	160	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
11	160	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
11	160	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
11	160	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
11	160	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
11	163	1	Surface	1,1-Dichloroethene	mg/kg	1.68E-01	4.60E-09	1.08E-07	2.69E-06
11	163	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
11	163	1	Surface	Antimony	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
11	163	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	1.37E-08	0.00E+00	8.84E-12
11	163	1	Surface	Cadmium	mg/kg	2.00E+00	5.48E-08	5.15E-09	3.54E-11
11	163	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	1.37E-08	1.29E-07	2.75E-07
11	163	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
11	163	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09
11	163	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	1.37E-08	1.29E-07	8.84E-12
11	163	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
11	163	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	4.66E-08	4.38E-07	3.00E-11
11	163	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
11	163	1	Surface	Thallium	mg/kg	1.50E+01	4.11E-07	1.93E-06	2.65E-10
11	163	1	Surface	Trichloroethene	mg/kg	1.68E-01	4.60E-09	1.08E-07	1.63E-06
11	163	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
11	163	1	Surface	Vinyl chloride	mg/kg	1.68E-01	4.60E-09	1.08E-07	3.13E-06
11	219	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
11	219	1	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
11	219	1	Surface	Hexachlorobenzene	mg/kg	3.60E-01	9.86E-09	9.27E-08	1.98E-07
11	219	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
11	219	1	Surface	PCB, Total	mg/kg	5.00E+00	1.37E-07	1.80E-06	1.49E-07
11	219	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
11	219	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10
11	219	1	Surface	Uranium	mg/kg	2.00E+01	5.48E-07	2.58E-06	3.54E-10
11	488	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
11	488	1	Surface	Chromium	mg/kg	8.50E+01	2.33E-06	1.09E-05	1.50E-09
11	488	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	1.01E-08	9.53E-08	2.04E-07
11	488	1	Surface	Mercury	mg/kg	1.00E+01	2.74E-07	1.29E-06	5.27E-06
11	488	1	Surface	Nickel	mg/kg	6.50E+01	1.78E-06	6.70E-06	1.15E-09

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.3. Noncarcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation
11	488	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	4.93E-08	4.64E-07	3.18E-11
11	488	1	Surface	Silver	mg/kg	1.00E+01	2.74E-07	1.03E-06	1.77E-10

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
5	1	1	Surface	3,3'-Dichlorobenzidine	mg/kg	8.90E-01	8.71E-09	8.19E-08	5.62E-12	n/a
5	1	1	Surface	Antimony	mg/kg	9.65E+00	9.44E-08	4.44E-07	6.09E-11	n/a
5	1	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.40E-01	4.31E-09	0.00E+00	2.78E-12	n/a
5	1	1	Surface	Hexachlorobenzene	mg/kg	4.40E-01	4.31E-09	4.05E-08	8.65E-08	n/a
5	1	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.40E-01	4.31E-09	4.05E-08	2.78E-12	n/a
5	1	1	Surface	Pentachlorophenol	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
5	1	1	Surface	Silver	mg/kg	3.20E+00	3.13E-08	1.18E-07	2.02E-11	n/a
5	1	1	Surface	Thallium	mg/kg	1.93E+01	1.89E-07	8.88E-07	1.22E-10	n/a
5	1	1	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
5	1	2	Surface	3,3'-Dichlorobenzidine	mg/kg	9.30E-01	9.10E-09	8.55E-08	5.87E-12	n/a
5	1	2	Surface	Bis(2-chloroethyl) ether	mg/kg	4.60E-01	4.50E-09	0.00E+00	2.90E-12	n/a
5	1	2	Surface	Hexachlorobenzene	mg/kg	4.60E-01	4.50E-09	4.23E-08	9.05E-08	n/a
5	1	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.60E-01	4.50E-09	4.23E-08	2.90E-12	n/a
5	1	2	Surface	Pentachlorophenol	mg/kg	2.30E+00	2.25E-08	2.12E-07	1.45E-11	n/a
5	1	2	Surface	Total PAH	mg/kg	4.60E-01	4.50E-09	5.50E-08	2.15E-10	n/a
5	1	3	Surface	1,4-Dichlorobenzene	mg/kg	2.30E+00	2.25E-08	0.00E+00	1.45E-11	n/a
5	1	3	Surface	Antimony	mg/kg	1.50E+01	1.47E-07	6.90E-07	9.47E-11	n/a
5	1	3	Surface	Bis(2-chloroethyl) ether	mg/kg	3.30E-01	3.23E-09	0.00E+00	2.08E-12	n/a
5	1	3	Surface	Cadmium	mg/kg	3.00E+00	2.94E-08	2.76E-09	1.89E-11	n/a
5	1	3	Surface	Hexachlorobenzene	mg/kg	2.30E+00	2.25E-08	2.12E-07	4.52E-07	n/a
5	1	3	Surface	Hexachlorobutadiene	mg/kg	2.30E+00	2.25E-08	2.12E-07	1.45E-11	n/a
5	1	3	Surface	Hexachloroethane	mg/kg	2.30E+00	2.25E-08	2.12E-07	1.45E-11	n/a
5	1	3	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.30E-01	3.23E-09	3.04E-08	2.08E-12	n/a
5	1	3	Surface	Pentachlorophenol	mg/kg	2.30E+00	2.25E-08	2.12E-07	1.45E-11	n/a
5	1	3	Surface	Silver	mg/kg	4.00E+00	3.91E-08	1.47E-07	2.53E-11	n/a
5	1	3	Surface	Thallium	mg/kg	2.50E+01	2.45E-07	1.15E-06	1.58E-10	n/a
5	1	3	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
5	1	4	Surface	3,3'-Dichlorobenzidine	mg/kg	7.80E-01	7.63E-09	7.17E-08	4.92E-12	n/a
5	1	4	Surface	Antimony	mg/kg	1.22E+01	1.19E-07	5.61E-07	7.70E-11	n/a
5	1	4	Surface	Bis(2-chloroethyl) ether	mg/kg	3.90E-01	3.82E-09	0.00E+00	2.46E-12	n/a
5	1	4	Surface	Cadmium	mg/kg	1.80E+00	1.76E-08	1.66E-09	1.14E-11	n/a
5	1	4	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
5	1	4	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.90E-01	3.82E-09	3.59E-08	2.46E-12	n/a
5	1	4	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	1	4	Surface	Thallium	mg/kg	1.80E+01	1.76E-07	8.28E-07	1.14E-10	n/a
5	1	4	Surface	Total PAH	mg/kg	4.80E-01	4.70E-09	5.74E-08	2.24E-10	n/a
5	1	5	Surface	3,3'-Dichlorobenzidine	mg/kg	8.20E-01	8.02E-09	7.54E-08	5.18E-12	n/a
5	1	5	Surface	Antimony	mg/kg	9.75E+00	9.54E-08	4.48E-07	6.15E-11	n/a
5	1	5	Surface	Bis(2-chloroethyl) ether	mg/kg	4.10E-01	4.01E-09	0.00E+00	2.59E-12	n/a
5	1	5	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	1	5	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.10E-01	4.01E-09	3.77E-08	2.59E-12	n/a
5	1	5	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	1	5	Surface	Thallium	mg/kg	1.95E+01	1.91E-07	8.97E-07	1.23E-10	n/a
5	99	1	Surface	Antimony	mg/kg	9.72E+00	9.51E-08	4.47E-07	6.14E-11	n/a
5	99	1	Surface	Cadmium	mg/kg	1.94E+00	1.90E-08	1.78E-09	1.22E-11	n/a
5	99	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	99	1	Surface	Thallium	mg/kg	1.94E+01	1.90E-07	8.92E-07	1.22E-10	n/a
5	99	1	Surface	Total PAH	mg/kg	4.80E-01	4.70E-09	5.74E-08	2.24E-10	n/a
5	99	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
5	194	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	194	1	Surface	Hexachlorobenzene	mg/kg	4.30E-01	4.21E-09	3.95E-08	8.46E-08	n/a
5	194	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	194	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	2	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
5	194	2	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	2	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	2	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	2	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	3	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	3	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	194	3	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	3	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	3	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	3	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	3	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	4	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	4	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	194	4	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	4	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	4	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	5	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	5	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	194	5	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	5	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	5	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	6	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	6	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
5	194	6	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	6	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	6	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	6	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	7	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	7	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
5	194	7	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	7	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	7	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	7	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	8	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	8	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
5	194	8	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	8	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	8	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	8	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	8	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	8	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	9	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a

CDI = chronic daily intake
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
5	194	9	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
5	194	9	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	9	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	9	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	9	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	9	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	9	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	10	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	10	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
5	194	10	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	10	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	10	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	10	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	10	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	11	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	194	11	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
5	194	11	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	194	11	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	12	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	194	12	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
5	194	12	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	12	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	12	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	194	12	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	13	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	13	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
5	194	13	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	13	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	13	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	13	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	13	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	14	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	14	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
5	194	14	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	14	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	14	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	14	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	14	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	15	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	15	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	15	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	15	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	16	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	16	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	194	16	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	16	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	16	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	16	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	16	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
5	194	17	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	194	17	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
5	194	17	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	17	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	17	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	17	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	194	17	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	17	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	18	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	18	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
5	194	18	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	18	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	18	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	18	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	18	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	19	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	194	19	Surface	Hexachlorobenzene	mg/kg	4.40E-01	4.31E-09	4.05E-08	8.65E-08	n/a
5	194	19	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	19	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	19	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	194	19	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	19	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	20	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	20	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
5	194	20	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	20	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	20	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	21	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	21	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
5	194	21	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	21	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	21	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	21	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	22	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	22	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
5	194	22	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	22	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	22	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	22	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	22	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	23	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	23	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	194	23	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	23	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	23	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	23	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	24	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	194	24	Surface	Hexachlorobenzene	mg/kg	4.40E-01	4.31E-09	4.05E-08	8.65E-08	n/a
5	194	24	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
5	194	24	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	24	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
5	194	24	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	24	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	25	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	25	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
5	194	25	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	25	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	25	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	25	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	194	25	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	26	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	26	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
5	194	26	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	26	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
5	194	26	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	26	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	26	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	27	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	27	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
5	194	27	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	27	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	27	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	27	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	28	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	28	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
5	194	28	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	28	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	28	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
5	194	28	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	29	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
5	194	29	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
5	194	29	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	194	29	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	29	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
5	194	29	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	30	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	30	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
5	194	30	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	194	30	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
5	194	30	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	31	Surface	3,3'-Dichlorobenzidine	mg/kg	4.70E-01	4.60E-09	4.32E-08	2.97E-12	n/a
5	194	31	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	31	Surface	Bis(2-chloroethyl) ether	mg/kg	4.70E-01	4.60E-09	0.00E+00	2.97E-12	n/a
5	194	31	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
5	194	31	Surface	Hexachlorobenzene	mg/kg	4.70E-01	4.60E-09	4.32E-08	9.24E-08	n/a
5	194	31	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.70E-01	4.60E-09	4.32E-08	2.97E-12	n/a
5	194	31	Surface	PCB, Total	mg/kg	1.00E-01	9.78E-10	1.29E-08	1.06E-09	n/a
5	194	31	Surface	Pentachlorophenol	mg/kg	4.70E-01	4.60E-09	4.32E-08	2.97E-12	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
5	194	31	Surface	Silver	mg/kg	4.00E+00	3.91E-08	1.47E-07	2.53E-11	n/a
5	194	31	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	194	31	Surface	Total PAH	mg/kg	4.70E-01	4.60E-09	5.62E-08	2.19E-10	n/a
5	196	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
5	196	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
5	196	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	196	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	196	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
5	196	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	196	2	Surface	Benzene	mg/kg	1.00E+00	9.78E-09	2.30E-07	2.46E-06	n/a
5	196	2	Surface	Silver	mg/kg	3.00E+00	2.94E-08	1.10E-07	1.89E-11	n/a
5	489	1	Surface	1,2,3-Trichloropropane	mg/kg	5.70E-03	5.58E-11	0.00E+00	3.60E-14	n/a
5	489	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
5	489	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
5	489	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	489	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	489	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
5	489	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
5	489	1	Surface	Trans-1,4-Dichloro-2-butene	mg/kg	1.10E-02	1.08E-10	1.01E-09	6.94E-14	n/a
5	489	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
5	531	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	531	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
5	531	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
5	531	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
5	531	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
5	531	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	200	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	200	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
6	200	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	200	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	212	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	212	1	Surface	Antimony	mg/kg	9.74E+00	9.53E-08	4.48E-07	6.15E-11	n/a
6	212	1	Surface	Bis(2-chloroethyl) ether	mg/kg	3.30E-01	3.23E-09	0.00E+00	2.08E-12	n/a
6	212	1	Surface	Cadmium	mg/kg	1.95E+00	1.91E-08	1.79E-09	1.23E-11	n/a
6	212	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
6	212	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	212	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.30E-01	3.23E-09	3.04E-08	2.08E-12	n/a
6	212	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	212	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	212	1	Surface	Thallium	mg/kg	1.95E+01	1.91E-07	8.97E-07	1.23E-10	n/a
6	212	1	Surface	Total PAH	mg/kg	4.90E-01	4.79E-09	5.86E-08	2.29E-10	n/a
6	213	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	213	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
6	213	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	213	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	213	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	213	2	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	213	2	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	213	2	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
6	214	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	214	1	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
6	214	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
6	214	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	214	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
6	214	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	214	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	214	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	214	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	215	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	215	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
6	215	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	215	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	215	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	215	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	215	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	216	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	216	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
6	216	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	216	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
6	216	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	216	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	216	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	217	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	217	1	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
6	217	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	217	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	217	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	217	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	217	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	217	2	Surface	Bis(2-chloroethyl) ether	mg/kg	3.70E-01	3.62E-09	0.00E+00	2.34E-12	n/a
6	217	2	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
6	217	2	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
6	217	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.70E-01	3.62E-09	3.40E-08	2.34E-12	n/a
6	217	2	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	217	2	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
6	217	2	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	217	2	Surface	Uranium	mg/kg	2.00E+02	1.96E-06	9.20E-06	1.26E-09	n/a
6	221	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	221	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
6	221	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	221	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	221	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	222	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
6	222	1	Surface	Antimony	mg/kg	7.00E-01	6.85E-09	3.22E-08	4.42E-12	n/a
6	222	1	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
6	222	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	222	1	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
6	222	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a

CDI = chronic daily intake
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
6	227	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	227	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	227	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	4.89E-09	0.00E+00	3.16E-12	n/a
6	227	1	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
6	227	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
6	227	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
6	227	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
6	227	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	227	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	227	1	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	227	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	227	2	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	227	2	Surface	Bis(2-chloroethyl) ether	mg/kg	4.80E-01	4.70E-09	0.00E+00	3.03E-12	n/a
6	227	2	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
6	227	2	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
6	227	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.80E-01	4.70E-09	4.41E-08	3.03E-12	n/a
6	227	2	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
6	227	2	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
6	227	2	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
6	228	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.60E+00	1.57E-08	1.47E-07	1.01E-11	n/a
6	228	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
6	228	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
6	228	1	Surface	Pentachlorophenol	mg/kg	1.60E+00	1.57E-08	1.47E-07	1.01E-11	n/a
7	76	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
7	76	1	Surface	Antimony	mg/kg	5.70E-01	5.58E-09	2.62E-08	3.60E-12	n/a
7	76	1	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
7	76	1	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
7	76	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
7	76	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
7	76	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
7	76	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
7	76	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
7	165	1	Surface	1,1-Dichloroethene	mg/kg	6.10E-01	5.97E-09	1.40E-07	3.49E-06	n/a
7	165	1	Surface	1,2-Dichloroethane	mg/kg	6.10E-01	5.97E-09	0.00E+00	3.85E-12	n/a
7	165	1	Surface	3,3'-Dichlorobenzidine	mg/kg	7.50E-01	7.34E-09	6.90E-08	4.73E-12	n/a
7	165	1	Surface	Benzene	mg/kg	6.10E-01	5.97E-09	1.40E-07	1.50E-06	n/a
7	165	1	Surface	Bis(2-chloroethyl) ether	mg/kg	3.70E-01	3.62E-09	0.00E+00	2.34E-12	n/a
7	165	1	Surface	Cadmium	mg/kg	5.00E+00	4.89E-08	4.60E-09	3.16E-11	n/a
7	165	1	Surface	Carbon tetrachloride	mg/kg	6.10E-01	5.97E-09	1.40E-07	2.79E-06	n/a
7	165	1	Surface	Chloroform	mg/kg	6.10E-01	5.97E-09	1.40E-07	1.71E-06	n/a
7	165	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
7	165	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	3.70E-01	3.62E-09	3.40E-08	2.34E-12	n/a
7	165	1	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
7	165	1	Surface	Tetrachloroethene	mg/kg	6.10E-01	5.97E-09	1.40E-07	2.04E-06	n/a
7	165	1	Surface	Thallium	mg/kg	1.96E+01	1.92E-07	9.01E-07	1.24E-10	n/a
7	165	1	Surface	Trichloroethene	mg/kg	6.10E-01	5.97E-09	1.40E-07	2.11E-06	n/a
7	170	1	Surface	PCB, Total	mg/kg	1.00E-01	9.78E-10	1.29E-08	1.06E-09	n/a
8	158	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
8	158	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a

CDI = chronic daily intake
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
8	158	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
8	158	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
8	158	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
8	169	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
8	169	1	Surface	Cadmium	mg/kg	1.10E+00	1.08E-08	1.01E-09	6.94E-12	n/a
8	169	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
8	169	1	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
8	169	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	19	1	Surface	Antimony	mg/kg	9.81E+01	9.60E-07	4.51E-06	6.19E-10	n/a
9	19	1	Surface	Chromium	mg/kg	2.96E+01	2.90E-07	1.36E-06	1.87E-10	n/a
9	19	1	Surface	Cobalt	mg/kg	4.76E+01	4.66E-07	2.19E-06	3.00E-10	n/a
9	19	1	Surface	Silver	mg/kg	9.90E+00	9.69E-08	3.64E-07	6.25E-11	n/a
9	138	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	138	1	Surface	Hexachlorobenzene	mg/kg	4.30E-01	4.21E-09	3.95E-08	8.46E-08	n/a
9	138	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	138	1	Surface	Thallium	mg/kg	5.00E+00	4.89E-08	2.30E-07	3.16E-11	n/a
9	138	1	Surface	Trichloroethene	mg/kg	1.00E+00	9.78E-09	2.30E-07	3.46E-06	n/a
9	138	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	138	2	Surface	1,1-Dichloroethene	mg/kg	1.00E+00	9.78E-09	2.30E-07	5.72E-06	n/a
9	138	2	Surface	1,2-Dichloroethane	mg/kg	1.00E+00	9.78E-09	0.00E+00	6.31E-12	n/a
9	138	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
9	138	2	Surface	Benzene	mg/kg	1.00E+00	9.78E-09	2.30E-07	2.46E-06	n/a
9	138	2	Surface	Carbon tetrachloride	mg/kg	1.00E+00	9.78E-09	2.30E-07	4.57E-06	n/a
9	138	2	Surface	Chloroform	mg/kg	1.00E+00	9.78E-09	2.30E-07	2.80E-06	n/a
9	138	2	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
9	138	2	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
9	138	2	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	138	2	Surface	Naphthalene	mg/kg	2.50E+00	2.45E-08	5.75E-07	5.26E-07	n/a
9	138	2	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
9	138	2	Surface	Tetrachloroethene	mg/kg	1.00E+00	9.78E-09	2.30E-07	3.35E-06	n/a
9	138	2	Surface	Trichloroethene	mg/kg	1.00E+00	9.78E-09	2.30E-07	3.46E-06	n/a
9	138	2	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	138	2	Surface	Vinyl chloride	mg/kg	1.10E+00	1.08E-08	2.53E-07	7.31E-06	n/a
9	180	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	180	1	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
9	180	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	180	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	180	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	180	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	180	2	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	180	2	Surface	Hexachlorobenzene	mg/kg	4.40E-01	4.31E-09	4.05E-08	8.65E-08	n/a
9	180	2	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	180	2	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	180	2	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	180	2	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	180	2	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	180	3	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	180	3	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
9	180	3	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
9	180	3	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	180	3	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	180	3	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	180	4	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	180	4	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
9	180	4	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	180	4	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	180	4	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	180	4	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	181	1	Surface	Antimony	mg/kg	8.34E+00	8.16E-08	3.84E-07	5.26E-11	n/a
9	181	1	Surface	Cadmium	mg/kg	2.49E+00	2.44E-08	2.29E-09	1.57E-11	n/a
9	181	1	Surface	PCB, Total	mg/kg	1.30E-01	1.27E-09	1.67E-08	1.38E-09	n/a
9	195	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	1	Surface	Hexachlorobenzene	mg/kg	4.50E-01	4.40E-09	4.14E-08	8.85E-08	n/a
9	195	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	1	Surface	Pentachlorophenol	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	2	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	2	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
9	195	2	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	2	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
9	195	2	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	2	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	2	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	3	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	3	Surface	Hexachlorobenzene	mg/kg	4.30E-01	4.21E-09	3.95E-08	8.46E-08	n/a
9	195	3	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	3	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	3	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	3	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	3	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	4	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	4	Surface	Hexachlorobenzene	mg/kg	4.50E-01	4.40E-09	4.14E-08	8.85E-08	n/a
9	195	4	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	4	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	4	Surface	Pentachlorophenol	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	4	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	4	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	5	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	5	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
9	195	5	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	5	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	5	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	5	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	5	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	6	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	6	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
9	195	6	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a

CDI = chronic daily intake
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
9	195	6	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	6	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	6	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	6	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	7	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	7	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
9	195	7	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	7	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
9	195	7	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	7	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	7	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	8	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	8	Surface	Hexachlorobenzene	mg/kg	4.40E-01	4.31E-09	4.05E-08	8.65E-08	n/a
9	195	8	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	8	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	8	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	8	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	8	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	9	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	9	Surface	Hexachlorobenzene	mg/kg	4.60E-01	4.50E-09	4.23E-08	9.05E-08	n/a
9	195	9	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	9	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	9	Surface	Pentachlorophenol	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	9	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	9	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	10	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	10	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
9	195	10	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	10	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	10	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	10	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	11	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	11	Surface	Hexachlorobenzene	mg/kg	4.30E-01	4.21E-09	3.95E-08	8.46E-08	n/a
9	195	11	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	11	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	11	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	11	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	11	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	12	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	12	Surface	Hexachlorobenzene	mg/kg	4.30E-01	4.21E-09	3.95E-08	8.46E-08	n/a
9	195	12	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	12	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	12	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	195	12	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	12	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	13	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	195	13	Surface	Hexachlorobenzene	mg/kg	3.90E-01	3.82E-09	3.59E-08	7.67E-08	n/a
9	195	13	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	13	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
9	195	13	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	195	13	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	13	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	14	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	14	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
9	195	14	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	14	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	14	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	14	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	14	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	15	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	15	Surface	Hexachlorobenzene	mg/kg	4.50E-01	4.40E-09	4.14E-08	8.85E-08	n/a
9	195	15	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	15	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
9	195	15	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	15	Surface	Pentachlorophenol	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	195	15	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	15	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	16	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	195	16	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
9	195	16	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
9	195	16	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
9	195	16	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
9	195	16	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
9	195	16	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	195	17	Surface	3,3'-Dichlorobenzidine	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	17	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
9	195	17	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	195	17	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	492	1	Surface	3,3'-Dichlorobenzidine	mg/kg	8.20E-01	8.02E-09	7.54E-08	5.18E-12	n/a
9	492	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	492	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.10E-01	4.01E-09	0.00E+00	2.59E-12	n/a
9	492	1	Surface	Hexachlorobenzene	mg/kg	4.10E-01	4.01E-09	3.77E-08	8.06E-08	n/a
9	492	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.10E-01	4.01E-09	3.77E-08	2.59E-12	n/a
9	492	1	Surface	Pentachlorophenol	mg/kg	2.00E+00	1.96E-08	1.84E-07	1.26E-11	n/a
9	492	1	Surface	Silver	mg/kg	4.00E+00	3.91E-08	1.47E-07	2.53E-11	n/a
9	492	1	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	492	1	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
9	493	1	Surface	3,3'-Dichlorobenzidine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
9	493	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	493	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	4.89E-09	0.00E+00	3.16E-12	n/a
9	493	1	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
9	493	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
9	493	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
9	493	1	Surface	Pentachlorophenol	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
9	493	1	Surface	Silver	mg/kg	4.00E+00	3.91E-08	1.47E-07	2.53E-11	n/a
9	493	1	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	493	1	Surface	Uranium	mg/kg	2.00E+03	1.96E-05	9.20E-05	1.26E-08	n/a
9	517	1	Surface	3,3'-Dichlorobenzidine	mg/kg	4.90E-01	4.79E-09	4.51E-08	3.09E-12	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
9	517	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	517	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.90E-01	4.79E-09	0.00E+00	3.09E-12	n/a
9	517	1	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
9	517	1	Surface	Hexachlorobenzene	mg/kg	4.90E-01	4.79E-09	4.51E-08	9.64E-08	n/a
9	517	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.90E-01	4.79E-09	4.51E-08	3.09E-12	n/a
9	517	1	Surface	Pentachlorophenol	mg/kg	4.90E-01	4.79E-09	4.51E-08	3.09E-12	n/a
9	517	1	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	517	1	Surface	Total PAH	mg/kg	4.90E-01	4.79E-09	5.86E-08	2.29E-10	n/a
9	517	1	Surface	Uranium	mg/kg	1.00E+02	9.78E-07	4.60E-06	6.31E-10	n/a
9	541	1	Surface	3,3'-Dichlorobenzidine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
9	541	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	541	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	4.89E-09	0.00E+00	3.16E-12	n/a
9	541	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
9	541	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
9	541	1	Surface	Pentachlorophenol	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
9	541	1	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
9	561	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	561	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.40E-01	4.31E-09	0.00E+00	2.78E-12	n/a
9	561	1	Surface	Cadmium	mg/kg	1.83E+00	1.79E-08	1.68E-09	1.16E-11	n/a
9	561	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
9	561	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.40E-01	4.31E-09	4.05E-08	2.78E-12	n/a
9	561	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
9	561	2	Surface	1,2,3-Trichloropropane	mg/kg	5.90E-03	5.77E-11	0.00E+00	3.72E-14	n/a
9	561	2	Surface	3,3'-Dichlorobenzidine	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	561	2	Surface	Bis(2-chloroethyl) ether	mg/kg	4.40E-01	4.31E-09	0.00E+00	2.78E-12	n/a
9	561	2	Surface	Hexachlorobenzene	mg/kg	4.90E-01	4.79E-09	4.51E-08	9.64E-08	n/a
9	561	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.40E-01	4.31E-09	4.05E-08	2.78E-12	n/a
9	561	2	Surface	Pentachlorophenol	mg/kg	2.20E+00	2.15E-08	2.02E-07	1.39E-11	n/a
9	561	2	Surface	Trans-1,4-Dichloro-2-butene	mg/kg	1.20E-02	1.17E-10	1.10E-09	7.58E-14	n/a
9	562	1	Surface	Antimony	mg/kg	8.20E+00	8.02E-08	3.77E-07	5.18E-11	n/a
9	562	1	Surface	Chromium	mg/kg	6.50E+01	6.36E-07	2.99E-06	4.10E-10	n/a
9	562	1	Surface	PCB, Total	mg/kg	1.00E+00	9.78E-09	1.29E-07	1.06E-08	n/a
9	562	1	Surface	Thallium	mg/kg	1.95E+00	1.91E-08	8.97E-08	1.23E-11	n/a
9	562	1	Surface	Total PAH	mg/kg	4.90E-01	4.79E-09	5.86E-08	2.29E-10	n/a
9	562	2	Surface	Antimony	mg/kg	8.30E+00	8.12E-08	3.82E-07	5.24E-11	n/a
9	562	2	Surface	Chromium	mg/kg	6.50E+01	6.36E-07	2.99E-06	4.10E-10	n/a
9	562	2	Surface	Thallium	mg/kg	1.93E+00	1.89E-08	8.88E-08	1.22E-11	n/a
9	562	2	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
9	562	3	Surface	Antimony	mg/kg	7.72E+00	7.55E-08	3.55E-07	4.87E-11	n/a
9	562	3	Surface	Thallium	mg/kg	1.79E+00	1.75E-08	8.23E-08	1.13E-11	n/a
9	562	4	Surface	Antimony	mg/kg	8.13E+00	7.95E-08	3.74E-07	5.13E-11	n/a
9	562	4	Surface	PCB, Total	mg/kg	1.00E+00	9.78E-09	1.29E-07	1.06E-08	n/a
9	562	4	Surface	Thallium	mg/kg	1.93E+00	1.89E-08	8.88E-08	1.22E-11	n/a
9	562	4	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
9	562	5	Surface	Antimony	mg/kg	9.53E+00	9.32E-08	4.38E-07	6.02E-11	n/a
9	562	5	Surface	Thallium	mg/kg	1.97E+00	1.93E-08	9.06E-08	1.24E-11	n/a
9	563	1	Surface	Antimony	mg/kg	8.26E+00	8.08E-08	3.80E-07	5.21E-11	n/a
9	563	1	Surface	Thallium	mg/kg	1.96E+00	1.92E-08	9.01E-08	1.24E-11	n/a
9	563	1	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
9	563	2	Surface	Antimony	mg/kg	7.85E+00	7.68E-08	3.61E-07	4.96E-11	n/a
9	563	2	Surface	Chromium	mg/kg	6.50E+01	6.36E-07	2.99E-06	4.10E-10	n/a
9	563	2	Surface	PCB, Total	mg/kg	1.00E+00	9.78E-09	1.29E-07	1.06E-08	n/a
9	563	2	Surface	Thallium	mg/kg	1.87E+00	1.83E-08	8.60E-08	1.18E-11	n/a
9	563	2	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
9	564	1	Surface	Antimony	mg/kg	8.83E+00	8.64E-08	4.06E-07	5.57E-11	n/a
9	564	1	Surface	Total PAH	mg/kg	4.90E-01	4.79E-09	5.86E-08	2.29E-10	n/a
9	567	1	Surface	Antimony	mg/kg	7.91E+00	7.74E-08	3.64E-07	4.99E-11	n/a
9	567	1	Surface	Cadmium	mg/kg	2.35E+00	2.30E-08	2.16E-09	1.48E-11	n/a
9	567	1	Surface	PCB, Total	mg/kg	1.30E-01	1.27E-09	1.67E-08	1.38E-09	n/a
9	567	1	Surface	Thallium	mg/kg	9.38E+00	9.18E-08	4.31E-07	5.92E-11	n/a
9	567	1	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
9	567	2	Surface	1,1-Dichloroethene	mg/kg	4.00E-02	3.91E-10	9.20E-09	2.29E-07	n/a
9	567	3	Surface	Antimony	mg/kg	8.14E+00	7.96E-08	3.74E-07	5.14E-11	n/a
9	567	3	Surface	Cadmium	mg/kg	2.27E+00	2.22E-08	2.09E-09	1.43E-11	n/a
9	567	3	Surface	PCB, Total	mg/kg	1.30E-01	1.27E-09	1.67E-08	1.38E-09	n/a
9	567	3	Surface	Thallium	mg/kg	9.08E+00	8.88E-08	4.18E-07	5.73E-11	n/a
9	567	3	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
9	567	4	Surface	Antimony	mg/kg	8.18E+00	8.00E-08	3.76E-07	5.16E-11	n/a
9	567	4	Surface	Cadmium	mg/kg	2.48E+00	2.43E-08	2.28E-09	1.57E-11	n/a
9	567	4	Surface	PCB, Total	mg/kg	1.30E-01	1.27E-09	1.67E-08	1.38E-09	n/a
9	567	4	Surface	Thallium	mg/kg	9.93E+00	9.72E-08	4.57E-07	6.27E-11	n/a
9	567	4	Surface	Total PAH	mg/kg	5.00E-01	4.89E-09	5.98E-08	2.33E-10	n/a
10	14	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
10	14	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
10	14	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	2	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
10	14	2	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	2	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	14	3	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	3	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
10	14	3	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	3	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	14	4	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
10	14	4	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
10	14	4	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
10	14	5	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
10	14	5	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
10	14	5	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
10	14	6	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	6	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
10	14	6	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	7	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
10	14	7	Surface	Hexachlorobenzene	mg/kg	4.00E-01	3.91E-09	3.68E-08	7.87E-08	n/a
10	14	7	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
10	14	7	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	14	8	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
10	14	8	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
10	14	8	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	9	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	9	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
10	14	9	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	9	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	14	10	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	10	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
10	14	10	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	14	10	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	518	1	Surface	1,2,4-Trichlorobenzene	mg/kg	2.40E+00	2.35E-08	0.00E+00	1.52E-11	n/a
10	518	1	Surface	1,4-Dichlorobenzene	mg/kg	2.40E+00	2.35E-08	0.00E+00	1.52E-11	n/a
10	518	1	Surface	2,4-Dinitrotoluene	mg/kg	2.40E+00	2.35E-08	2.25E-07	1.52E-11	n/a
10	518	1	Surface	3,3'-Dichlorobenzidine	mg/kg	2.40E+00	2.35E-08	2.21E-07	1.52E-11	n/a
10	518	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
10	518	1	Surface	Bis(2-chloroethyl) ether	mg/kg	2.40E+00	2.35E-08	0.00E+00	1.52E-11	n/a
10	518	1	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
10	518	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
10	518	1	Surface	Hexachloroethane	mg/kg	2.40E+00	2.35E-08	2.21E-07	1.52E-11	n/a
10	518	1	Surface	Naphthalene	mg/kg	2.40E+00	2.35E-08	5.52E-07	5.05E-07	n/a
10	518	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	2.40E+00	2.35E-08	2.21E-07	1.52E-11	n/a
10	518	1	Surface	Pentachlorophenol	mg/kg	2.40E+00	2.35E-08	2.21E-07	1.52E-11	n/a
10	518	1	Surface	Silver	mg/kg	4.00E+00	3.91E-08	1.47E-07	2.53E-11	n/a
10	518	1	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
10	520	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.60E+00	1.57E-08	1.47E-07	1.01E-11	n/a
10	520	1	Surface	Antimony	mg/kg	9.30E+00	9.10E-08	4.28E-07	5.87E-11	n/a
10	520	1	Surface	Cadmium	mg/kg	1.86E+00	1.82E-08	1.71E-09	1.17E-11	n/a
10	520	1	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
10	520	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
10	520	1	Surface	Pentachlorophenol	mg/kg	1.60E+00	1.57E-08	1.47E-07	1.01E-11	n/a
10	520	1	Surface	Thallium	mg/kg	1.86E+01	1.82E-07	8.55E-07	1.17E-10	n/a
10	520	2	Surface	3,3'-Dichlorobenzidine	mg/kg	1.60E+00	1.57E-08	1.47E-07	1.01E-11	n/a
10	520	2	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
10	520	2	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	4.89E-09	0.00E+00	3.16E-12	n/a
10	520	2	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
10	520	2	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
10	520	2	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
10	520	2	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
10	520	2	Surface	Pentachlorophenol	mg/kg	1.60E+00	1.57E-08	1.47E-07	1.01E-11	n/a
10	520	2	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	520	2	Surface	Thallium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
10	520	3	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	520	3	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
10	520	3	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
10	520	3	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
10	520	3	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	520	4	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	520	4	Surface	Hexachlorobenzene	mg/kg	3.40E-01	3.33E-09	3.13E-08	6.69E-08	n/a
10	520	4	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcinogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
10	520	4	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
10	520	5	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
10	520	5	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
10	520	5	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
10	520	5	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
10	520	5	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
10	520	5	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
10	520	5	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
11	81	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
11	81	1	Surface	Antimony	mg/kg	1.31E+01	1.28E-07	6.02E-07	8.27E-11	n/a
11	81	1	Surface	Bis(2-chloroethyl) ether	mg/kg	4.20E-01	4.11E-09	0.00E+00	2.65E-12	n/a
11	81	1	Surface	Hexachlorobenzene	mg/kg	4.20E-01	4.11E-09	3.86E-08	8.26E-08	n/a
11	81	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	4.20E-01	4.11E-09	3.86E-08	2.65E-12	n/a
11	81	1	Surface	Pentachlorophenol	mg/kg	2.10E+00	2.05E-08	1.93E-07	1.33E-11	n/a
11	81	1	Surface	Thallium	mg/kg	8.00E-01	7.83E-09	3.68E-08	5.05E-12	n/a
11	153	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
11	153	1	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
11	153	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
11	153	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
11	153	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
11	153	1	Surface	Pentachlorophenol	mg/kg	1.90E+00	1.86E-08	1.75E-07	1.20E-11	n/a
11	153	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
11	153	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
11	156	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
11	156	1	Surface	Hexachlorobenzene	mg/kg	3.80E-01	3.72E-09	3.50E-08	7.47E-08	n/a
11	156	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
11	156	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
11	160	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
11	160	1	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
11	160	1	Surface	Hexachlorobenzene	mg/kg	3.50E-01	3.42E-09	3.22E-08	6.88E-08	n/a
11	160	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
11	160	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
11	160	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
11	160	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
11	160	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
11	160	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
11	163	1	Surface	1,1-Dichloroethene	mg/kg	1.68E-01	1.64E-09	3.86E-08	9.61E-07	n/a
11	163	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
11	163	1	Surface	Antimony	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
11	163	1	Surface	Bis(2-chloroethyl) ether	mg/kg	5.00E-01	4.89E-09	0.00E+00	3.16E-12	n/a
11	163	1	Surface	Cadmium	mg/kg	2.00E+00	1.96E-08	1.84E-09	1.26E-11	n/a
11	163	1	Surface	Hexachlorobenzene	mg/kg	5.00E-01	4.89E-09	4.60E-08	9.83E-08	n/a
11	163	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
11	163	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
11	163	1	Surface	N-Nitroso-di-n-propylamine	mg/kg	5.00E-01	4.89E-09	4.60E-08	3.16E-12	n/a
11	163	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
11	163	1	Surface	Pentachlorophenol	mg/kg	1.70E+00	1.66E-08	1.56E-07	1.07E-11	n/a
11	163	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
11	163	1	Surface	Thallium	mg/kg	1.50E+01	1.47E-07	6.90E-07	9.47E-11	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.4. Carcenogenic CDIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

Ch	SWMU	EU	Depth	COPC	Units	EPC	Ingestion	Dermal	Inhalation	External Exposure
11	163	1	Surface	Trichloroethene	mg/kg	1.68E-01	1.64E-09	3.86E-08	5.82E-07	n/a
11	163	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
11	163	1	Surface	Vinyl chloride	mg/kg	1.68E-01	1.64E-09	3.86E-08	1.12E-06	n/a
11	219	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
11	219	1	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
11	219	1	Surface	Hexachlorobenzene	mg/kg	3.60E-01	3.52E-09	3.31E-08	7.08E-08	n/a
11	219	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
11	219	1	Surface	PCB, Total	mg/kg	5.00E+00	4.89E-08	6.44E-07	5.32E-08	n/a
11	219	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
11	219	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a
11	219	1	Surface	Uranium	mg/kg	2.00E+01	1.96E-07	9.20E-07	1.26E-10	n/a
11	488	1	Surface	3,3'-Dichlorobenzidine	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
11	488	1	Surface	Chromium	mg/kg	8.50E+01	8.32E-07	3.91E-06	5.37E-10	n/a
11	488	1	Surface	Hexachlorobenzene	mg/kg	3.70E-01	3.62E-09	3.40E-08	7.28E-08	n/a
11	488	1	Surface	Mercury	mg/kg	1.00E+01	9.78E-08	4.60E-07	1.88E-06	n/a
11	488	1	Surface	Nickel	mg/kg	6.50E+01	6.36E-07	2.39E-06	4.10E-10	n/a
11	488	1	Surface	Pentachlorophenol	mg/kg	1.80E+00	1.76E-08	1.66E-07	1.14E-11	n/a
11	488	1	Surface	Silver	mg/kg	1.00E+01	9.78E-08	3.68E-07	6.31E-11	n/a

CDI = chronic daily intake
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
1	1	Surface	Antimony	9.65E+00	0.0	0.0	n/a	0.0	35%
1	1	Surface	Hexachlorobenzene	4.40E-01	0.0	0.0	n/a	0.0	0%
1	1	Surface	Pentachlorophenol	2.20E+00	0.0	0.0	n/a	0.0	0%
1	1	Surface	Silver	3.20E+00	0.0	0.0	n/a	0.0	3%
1	1	Surface	Thallium	1.93E+01	0.0	0.0	n/a	0.0	62%
1	1	Surface	Totals		0.0	0.1	n/a	0.1	
1	1		Percent		12%	88%	n/a		
1	2	Surface	Hexachlorobenzene	4.60E-01	0.0	0.0	n/a	0.0	56%
1	2	Surface	Pentachlorophenol	2.30E+00	0.0	0.0	n/a	0.0	44%
1	2	Surface	Totals		0.0	0.0	n/a	0.0	
1	2		Percent		10%	90%	n/a		
1	3	Surface	1,4-Dichlorobenzene	2.30E+00	0.0	0.0	0.0	0.0	0%
1	3	Surface	Antimony	1.50E+01	0.0	0.0	n/a	0.0	38%
1	3	Surface	Cadmium	3.00E+00	0.0	0.0	0.0	0.0	0%
1	3	Surface	Hexachlorobenzene	2.30E+00	0.0	0.0	n/a	0.0	1%
1	3	Surface	Hexachlorobutadiene	2.30E+00	0.0	0.0	n/a	0.0	1%
1	3	Surface	Hexachloroethane	2.30E+00	0.0	0.0	0.0	0.0	1%
1	3	Surface	Pentachlorophenol	2.30E+00	0.0	0.0	n/a	0.0	0%
1	3	Surface	Silver	4.00E+00	0.0	0.0	n/a	0.0	2%
1	3	Surface	Thallium	2.50E+01	0.0	0.0	n/a	0.0	56%
1	3	Surface	Totals		0.0	0.1	0.0	0.1	
1	3		Percent		11%	89%	0%		
1	4	Surface	Antimony	1.22E+01	0.0	0.0	n/a	0.0	43%
1	4	Surface	Cadmium	1.80E+00	0.0	0.0	0.0	0.0	0%
1	4	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
1	4	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
1	4	Surface	Thallium	1.80E+01	0.0	0.0	n/a	0.0	56%
1	4	Surface	Totals		0.0	0.1	0.0	0.1	
1	4		Percent		11%	89%	0%		
1	5	Surface	Antimony	9.75E+00	0.0	0.0	n/a	0.0	36%
1	5	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
1	5	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
1	5	Surface	Thallium	1.95E+01	0.0	0.0	n/a	0.0	64%
1	5	Surface	Totals		0.0	0.1	n/a	0.1	
1	5		Percent		12%	88%	n/a		
99	1	Surface	Antimony	9.72E+00	0.0	0.0	n/a	0.0	35%
99	1	Surface	Cadmium	1.94E+00	0.0	0.0	0.0	0.0	0%
99	1	Surface	Thallium	1.94E+01	0.0	0.0	n/a	0.0	62%
99	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
99	1	Surface	Totals		0.0	0.1	0.0	0.1	
99	1		Percent		12%	88%	0%		
194	1	Surface	Hexachlorobenzene	4.30E-01	0.0	0.0	n/a	0.0	12%
194	1	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	9%
194	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	79%
194	1	Surface	Totals		0.0	0.0	0.0	0.0	
194	1		Percent		16%	84%	0%		
194	2	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
194	2	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	88%
194	2	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	12%
194	2	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	2	Surface	Totals		0.0	0.1	0.0	0.1	
194	2		Percent		1%	98%	0%		

SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
HI = hazard index

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
194	3	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
194	3	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	3	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	3	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	3	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	3	Surface	Totals		0.0	0.1	0.0	0.1	
194	3		Percent		2%	98%	0%		
194	4	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	11%
194	4	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	9%
194	4	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	80%
194	4	Surface	Totals		0.0	0.0	0.0	0.0	
194	4		Percent		16%	84%	0%		
194	5	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	11%
194	5	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	9%
194	5	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	80%
194	5	Surface	Totals		0.0	0.0	0.0	0.0	
194	5		Percent		16%	84%	0%		
194	6	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
194	6	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	6	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	6	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	6	Surface	Totals		0.0	0.1	0.0	0.1	
194	6		Percent		2%	98%	0%		
194	7	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
194	7	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	7	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	7	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	7	Surface	Totals		0.0	0.1	0.0	0.1	
194	7		Percent		2%	98%	0%		
194	8	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
194	8	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	81%
194	8	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
194	8	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	8	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
194	8	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
194	8	Surface	Totals		0.0	0.1	0.0	0.1	
194	8		Percent		2%	98%	0%		
194	9	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
194	9	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	81%
194	9	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
194	9	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	9	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
194	9	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
194	9	Surface	Totals		0.0	0.1	0.0	0.1	
194	9		Percent		2%	98%	0%		
194	10	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
194	10	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	10	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	10	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	10	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	10	Surface	Totals		0.0	0.1	0.0	0.1	
194	10		Percent		2%	98%	0%		

¹ = Percentage of COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
194	11	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	10%
194	11	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	8%
194	11	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	82%
194	11	Surface	Totals		0.0	0.0	0.0	0.0	
194	11		Percent		16%	84%	0%		
194	12	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	0%
194	12	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	12	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
194	12	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	12	Surface	Totals		0.0	0.1	0.0	0.1	
194	12		Percent		2%	98%	0%		
194	13	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	0%
194	13	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	13	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	13	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	13	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	13	Surface	Totals		0.0	0.1	0.0	0.1	
194	13		Percent		2%	98%	0%		
194	14	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	1%
194	14	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	57%
194	14	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	1%
194	14	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	35%
194	14	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	7%
194	14	Surface	Totals		0.0	0.0	0.0	0.0	
194	14		Percent		2%	97%	0%		
194	15	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	87%
194	15	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	12%
194	15	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
194	15	Surface	Totals		0.0	0.1	0.0	0.1	
194	15		Percent		2%	98%	0%		
194	16	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
194	16	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	16	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	16	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	16	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	16	Surface	Totals		0.0	0.1	0.0	0.1	
194	16		Percent		2%	98%	0%		
194	17	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	0%
194	17	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	81%
194	17	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
194	17	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
194	17	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
194	17	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
194	17	Surface	Totals		0.0	0.1	0.0	0.1	
194	17		Percent		2%	98%	0%		
194	18	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	0%
194	18	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	18	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	18	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	18	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	18	Surface	Totals		0.0	0.1	0.0	0.1	
194	18		Percent		2%	98%	0%		

1 = Percentage of COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
194	19	Surface	Hexachlorobenzene	4.40E-01	0.0	0.0	n/a	0.0	0%
194	19	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	19	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
194	19	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	19	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	19	Surface	Totals		0.0	0.1	0.0	0.1	
194	19		Percent		2%	98%	0%		
194	20	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	11%
194	20	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	9%
194	20	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	80%
194	20	Surface	Totals		0.0	0.0	0.0	0.0	
194	20		Percent		16%	84%	0%		
194	21	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	2%
194	21	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	2%
194	21	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	80%
194	21	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	16%
194	21	Surface	Totals		0.0	0.0	0.0	0.0	
194	21		Percent		4%	96%	0%		
194	22	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
194	22	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	81%
194	22	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
194	22	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	22	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
194	22	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
194	22	Surface	Totals		0.0	0.1	0.0	0.1	
194	22		Percent		2%	98%	0%		
194	23	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
194	23	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	23	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	23	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	23	Surface	Totals		0.0	0.1	0.0	0.1	
194	23		Percent		2%	98%	0%		
194	24	Surface	Hexachlorobenzene	4.40E-01	0.0	0.0	n/a	0.0	0%
194	24	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	24	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
194	24	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	24	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	24	Surface	Totals		0.0	0.1	0.0	0.1	
194	24		Percent		2%	98%	0%		
194	25	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
194	25	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
194	25	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	25	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
194	25	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	25	Surface	Totals		0.0	0.1	0.0	0.1	
194	25		Percent		2%	98%	0%		
194	26	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
194	26	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	86%
194	26	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	12%
194	26	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	26	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
194	26	Surface	Totals		0.0	0.1	0.0	0.1	

¹ = Percentage of COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
194	26		Percent		2%	98%	0%		
194	27	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	0%
194	27	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	27	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
194	27	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	27	Surface	Totals		0.0	0.1	0.0	0.1	
194	27		Percent		2%	98%	0%		
194	28	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
194	28	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	28	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
194	28	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	28	Surface	Totals		0.0	0.1	0.0	0.1	
194	28		Percent		2%	98%	0%		
194	29	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	0%
194	29	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
194	29	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
194	29	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
194	29	Surface	Totals		0.0	0.1	0.0	0.1	
194	29		Percent		2%	98%	0%		
194	30	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	11%
194	30	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	9%
194	30	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	80%
194	30	Surface	Totals		0.0	0.0	0.0	0.0	
194	30		Percent		16%	84%	0%		
194	31	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	52%
194	31	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
194	31	Surface	Hexachlorobenzene	4.70E-01	0.0	0.0	n/a	0.0	0%
194	31	Surface	Pentachlorophenol	4.70E-01	0.0	0.0	n/a	0.0	0%
194	31	Surface	Silver	4.00E+00	0.0	0.0	n/a	0.0	2%
194	31	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	45%
194	31	Surface	Totals		0.0	0.1	0.0	0.1	
194	31		Percent		10%	90%	0%		
196	1	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
196	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	92%
196	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
196	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
196	1	Surface	Totals		0.0	0.1	n/a	0.1	
196	1		Percent		1%	99%	n/a		
196	2	Surface	Benzene	1.00E+00	0.0	0.0	0.0	0.0	38%
196	2	Surface	Silver	3.00E+00	0.0	0.0	n/a	0.0	62%
196	2	Surface	Totals		0.0	0.0	0.0	0.0	
196	2		Percent		1%	67%	32%		
489	1	Surface	1,2,3-Trichloropropane	5.70E-03	0.0	0.0	0.0	0.0	0%
489	1	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
489	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
489	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
489	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
489	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
489	1	Surface	Totals		0.0	0.1	0.0	0.1	
489	1		Percent		2%	98%	0%		
531	1	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	0%
531	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	92%

1 = Percentage of COPC to Total COPC to Surface
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
531	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
531	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
531	1	Surface	Totals		0.0	0.1	n/a	0.1	
531	1		Percent		1%	99%	n/a		
200	1	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	2%
200	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	2%
200	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
200	1	Surface	Totals		0.0	0.0	n/a	0.0	
200	1		Percent		1%	99%	n/a		
212	1	Surface	Antimony	9.74E+00	0.0	0.0	n/a	0.0	17%
212	1	Surface	Cadmium	1.95E+00	0.0	0.0	0.0	0.0	0%
212	1	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	0%
212	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	49%
212	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
212	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	4%
212	1	Surface	Thallium	1.95E+01	0.0	0.0	n/a	0.0	30%
212	1	Surface	Totals		0.0	0.1	0.0	0.1	
212	1		Percent		7%	93%	0%		
213	1	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	0%
213	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
213	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
213	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
213	1	Surface	Totals		0.0	0.1	0.0	0.1	
213	1		Percent		2%	98%	0%		
213	2	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
213	2	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
213	2	Surface	Totals		0.0	0.1	0.0	0.1	
213	2		Percent		2%	98%	0%		
214	1	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
214	1	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	0%
214	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	80%
214	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
214	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
214	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
214	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
214	1	Surface	Totals		0.0	0.1	0.0	0.1	
214	1		Percent		2%	98%	0%		
215	1	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	0%
215	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
215	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
215	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
215	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
215	1	Surface	Totals		0.0	0.1	0.0	0.1	
215	1		Percent		2%	98%	0%		
216	1	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
216	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	82%
216	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
216	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
216	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
216	1	Surface	Totals		0.0	0.1	0.0	0.1	
216	1		Percent		1%	99%	0%		
217	1	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	0%

¹ = Percentage of COPC to Total COPC to Surface
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
217	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
217	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
217	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
217	1	Surface	Totals		0.0	0.1	0.0	0.1	
217	1		Percent		2%	98%	0%		
217	2	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	1%
217	2	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	0%
217	2	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
217	2	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	78%
217	2	Surface	Uranium	2.00E+02	0.0	0.0	0.0	0.0	21%
217	2	Surface	Totals		0.0	0.0	0.0	0.1	
217	2		Percent		18%	82%	0%		
221	1	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	0%
221	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	92%
221	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
221	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
221	1	Surface	Totals		0.0	0.1	n/a	0.1	
221	1		Percent		1%	99%	n/a		
222	1	Surface	Antimony	7.00E-01	0.0	0.0	n/a	0.0	2%
222	1	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
222	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	90%
222	1	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
222	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
222	1	Surface	Totals		0.0	0.1	n/a	0.1	
222	1		Percent		2%	98%	n/a		
227	1	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	29%
227	1	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
227	1	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	0%
227	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	41%
227	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
227	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	3%
227	1	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	26%
227	1	Surface	Totals		0.0	0.1	0.0	0.2	
227	1		Percent		6%	94%	0%		
227	2	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	50%
227	2	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
227	2	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	0%
227	2	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
227	2	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	6%
227	2	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	44%
227	2	Surface	Totals		0.0	0.1	0.0	0.1	
227	2		Percent		9%	91%	0%		
228	1	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	57%
228	1	Surface	Pentachlorophenol	1.60E+00	0.0	0.0	n/a	0.0	43%
228	1	Surface	Totals		0.0	0.0	n/a	0.0	
228	1		Percent		10%	90%	n/a		
76	1	Surface	Antimony	5.70E-01	0.0	0.0	n/a	0.0	2%
76	1	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
76	1	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	0%
76	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	79%
76	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
76	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%

1 = Percentage of COPC to Total COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
76	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
76	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
76	1	Surface	Totals		0.0	0.1	0.0	0.1	
76	1		Percent		2%	98%	0%		
165	1	Surface	1,1-Dichloroethene	6.10E-01	0.0	0.0	0.0	0.0	0%
165	1	Surface	1,2-Dichloroethane	6.10E-01	0.0	0.0	0.0	0.0	0%
165	1	Surface	Benzene	6.10E-01	0.0	0.0	0.0	0.0	1%
165	1	Surface	Cadmium	5.00E+00	0.0	0.0	0.0	0.0	2%
165	1	Surface	Carbon tetrachloride	6.10E-01	0.0	0.0	0.0	0.0	1%
165	1	Surface	Chloroform	6.10E-01	0.0	0.0	0.0	0.0	0%
165	1	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	0%
165	1	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
165	1	Surface	Tetrachloroethene	6.10E-01	0.0	0.0	0.0	0.0	0%
165	1	Surface	Thallium	1.96E+01	0.0	0.0	n/a	0.0	90%
165	1	Surface	Trichloroethene	6.10E-01	0.0	0.0	0.0	0.0	4%
165	1	Surface	Totals		0.0	0.0	0.0	0.0	
165	1		Percent		16%	80%	4%		
170	1		Percent						
158	1	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	2%
158	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	2%
158	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
158	1	Surface	Totals		0.0	0.0	n/a	0.0	
158	1		Percent		0.0	1.0	n/a		
169	1	Surface	Cadmium	1.10E+00	0.0	0.0	0.0	0.0	3%
169	1	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	2%
169	1	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	2%
169	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	93%
169	1	Surface	Totals		0.0	0.0	0.0	0.0	
169	1		Percent		0.0	1.0	0.0		
19	1	Surface	Antimony	9.81E+01	0.0	0.2	n/a	0.2	88%
19	1	Surface	Chromium	2.96E+01	0.0	0.0	n/a	0.0	0%
19	1	Surface	Cobalt	4.76E+01	0.0	0.0	0.0	0.0	10%
19	1	Surface	Silver	9.90E+00	0.0	0.0	n/a	0.0	2%
19	1	Surface	Totals		0.0	0.2	0.0	0.2	
19	1		Percent		0.0	1.0	0.0		
138	1	Surface	Hexachlorobenzene	4.30E-01	0.0	0.0	n/a	0.0	1%
138	1	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	1%
138	1	Surface	Thallium	5.00E+00	0.0	0.0	n/a	0.0	69%
138	1	Surface	Trichloroethene	1.00E+00	0.0	0.0	0.0	0.0	22%
138	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	7%
138	1	Surface	Totals		0.0	0.0	0.0	0.0	
138	1		Percent		0.1	0.8	0.1		
138	2	Surface	1,1-Dichloroethene	1.00E+00	0.0	0.0	0.0	0.0	0%
138	2	Surface	1,2-Dichloroethane	1.00E+00	0.0	0.0	0.0	0.0	0%
138	2	Surface	Benzene	1.00E+00	0.0	0.0	0.0	0.0	1%
138	2	Surface	Carbon tetrachloride	1.00E+00	0.0	0.0	0.0	0.0	1%
138	2	Surface	Chloroform	1.00E+00	0.0	0.0	0.0	0.0	0%
138	2	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
138	2	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
138	2	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	86%
138	2	Surface	Naphthalene	2.50E+00	0.0	0.0	0.0	0.0	2%
138	2	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%

¹ = Percentage of COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
138	2	Surface	Tetrachloroethene	1.00E+00	0.0	0.0	0.0	0.0	0%
138	2	Surface	Trichloroethene	1.00E+00	0.0	0.0	0.0	0.0	4%
138	2	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
138	2	Surface	Vinyl chloride	1.10E+00	0.0	0.0	0.0	0.0	1%
138	2	Surface	Totals		0.0	0.1	0.0	0.1	
138	2		Percent		0.0	0.9	0.1		
180	1	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	2%
180	1	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	2%
180	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	80%
180	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	16%
180	1	Surface	Totals		0.0	0.0	0.0	0.0	
180	1		Percent		0.0	1.0	0.0		
180	2	Surface	Hexachlorobenzene	4.40E-01	0.0	0.0	n/a	0.0	0%
180	2	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
180	2	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
180	2	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
180	2	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
180	2	Surface	Totals		0.0	0.1	0.0	0.1	
180	2		Percent		0.0	1.0	0.0		
180	3	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
180	3	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
180	3	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
180	3	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
180	3	Surface	Totals		0.0	0.1	0.0	0.1	
180	3		Percent		0.0	1.0	0.0		
180	4	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
180	4	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
180	4	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
180	4	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
180	4	Surface	Totals		0.0	0.1	0.0	0.1	
180	4		Percent		0.0	1.0	0.0		
181	1	Surface	Antimony	8.34E+00	0.0	0.0	n/a	0.0	98%
181	1	Surface	Cadmium	2.49E+00	0.0	0.0	0.0	0.0	2%
181	1	Surface	Totals		0.0	0.0	0.0	0.0	
181	1		Percent		0.0	1.0	0.0		
195	1	Surface	Hexachlorobenzene	4.50E-01	0.0	0.0	n/a	0.0	0%
195	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
195	1	Surface	Pentachlorophenol	2.20E+00	0.0	0.0	n/a	0.0	0%
195	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	1	Surface	Totals		0.0	0.1	0.0	0.1	
195	1		Percent		0.0	1.0	0.0		
195	2	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
195	2	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	86%
195	2	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	12%
195	2	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
195	2	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
195	2	Surface	Totals		0.0	0.1	0.0	0.1	
195	2		Percent		0.0	1.0	0.0		
195	3	Surface	Hexachlorobenzene	4.30E-01	0.0	0.0	n/a	0.0	0%
195	3	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	3	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
195	3	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%

¹ = Percentage of COPC to Total COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
195	3	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	3	Surface	Totals		0.0	0.1	0.0	0.1	
195	3		Percent		0.0	1.0	0.0		
195	4	Surface	Hexachlorobenzene	4.50E-01	0.0	0.0	n/a	0.0	0%
195	4	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	90%
195	4	Surface	Pentachlorophenol	2.20E+00	0.0	0.0	n/a	0.0	0%
195	4	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	4	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	4	Surface	Totals		0.0	0.1	0.0	0.1	
195	4		Percent		0.0	1.0	0.0		
195	5	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
195	5	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	5	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
195	5	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	5	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	5	Surface	Totals		0.0	0.1	0.0	0.1	
195	5		Percent		0.0	1.0	0.0		
195	6	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
195	6	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	6	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
195	6	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	6	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	6	Surface	Totals		0.0	0.1	0.0	0.1	
195	6		Percent		0.0	1.0	0.0		
195	7	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
195	7	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	86%
195	7	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	12%
195	7	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
195	7	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
195	7	Surface	Totals		0.0	0.1	0.0	0.1	
195	7		Percent		0.0	1.0	0.0		
195	8	Surface	Hexachlorobenzene	4.40E-01	0.0	0.0	n/a	0.0	0%
195	8	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	8	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
195	8	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	8	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	8	Surface	Totals		0.0	0.1	0.0	0.1	
195	8		Percent		0.0	1.0	0.0		
195	9	Surface	Hexachlorobenzene	4.60E-01	0.0	0.0	n/a	0.0	0%
195	9	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	90%
195	9	Surface	Pentachlorophenol	2.20E+00	0.0	0.0	n/a	0.0	0%
195	9	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	9	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	9	Surface	Totals		0.0	0.1	0.0	0.1	
195	9		Percent		0.0	1.0	0.0		
195	10	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
195	10	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	98%
195	10	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
195	10	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	10	Surface	Totals		0.0	0.1	0.0	0.1	
195	10		Percent		0.0	1.0	0.0		
195	10	Surface	Hexachlorobenzene	4.30E-01	0.0	0.0	n/a	0.0	0%

¹ = Percentage of COPC to Total COPC to Surface
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
195	11	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	11	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
195	11	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	11	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	11	Surface	Totals		0.0	0.1	0.0	0.1	
195	11		Percent		0.0	1.0	0.0		
195	12	Surface	Hexachlorobenzene	4.30E-01	0.0	0.0	n/a	0.0	0%
195	12	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	12	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
195	12	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	12	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	12	Surface	Totals		0.0	0.1	0.0	0.1	
195	12		Percent		0.0	1.0	0.0		
195	13	Surface	Hexachlorobenzene	3.90E-01	0.0	0.0	n/a	0.0	0%
195	13	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	13	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
195	13	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	13	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	13	Surface	Totals		0.0	0.1	0.0	0.1	
195	13		Percent		0.0	1.0	0.0		
195	14	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
195	14	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	14	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
195	14	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	14	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	14	Surface	Totals		0.0	0.1	0.0	0.1	
195	14		Percent		0.0	1.0	0.0		
195	15	Surface	Hexachlorobenzene	4.50E-01	0.0	0.0	n/a	0.0	0%
195	15	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	81%
195	15	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
195	15	Surface	Pentachlorophenol	2.20E+00	0.0	0.0	n/a	0.0	0%
195	15	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
195	15	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
195	15	Surface	Totals		0.0	0.1	0.0	0.1	
195	15		Percent		0.0	1.0	0.0		
195	16	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	0%
195	16	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
195	16	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
195	16	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
195	16	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
195	16	Surface	Totals		0.0	0.1	0.0	0.1	
195	16		Percent		0.0	1.0	0.0		
195	17	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	11%
195	17	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	9%
195	17	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	80%
195	17	Surface	Totals		0.0	0.0	0.0	0.0	
195	17		Percent		0.2	0.8	0.0		
492	1	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	52%
492	1	Surface	Hexachlorobenzene	4.10E-01	0.0	0.0	n/a	0.0	0%
492	1	Surface	Pentachlorophenol	2.00E+00	0.0	0.0	n/a	0.0	0%
492	1	Surface	Silver	4.00E+00	0.0	0.0	n/a	0.0	2%
492	1	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	46%

¹ = Percentage of COPC to Total COPC to Surface
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
492	1	Surface	Totals		0.0	0.1	n/a	0.1	
492	1		Percent		0.1	0.9	n/a		
493	1	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	23%
493	1	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
493	1	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	0%
493	1	Surface	Pentachlorophenol	5.00E-01	0.0	0.0	n/a	0.0	0%
493	1	Surface	Silver	4.00E+00	0.0	0.0	n/a	0.0	1%
493	1	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	21%
493	1	Surface	Uranium	2.00E+03	0.0	0.1	0.0	0.1	55%
493	1	Surface	Totals		0.0	0.2	0.0	0.2	
493	1		Percent		0.1	0.9	0.0		
517	1	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	50%
517	1	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
517	1	Surface	Hexachlorobenzene	4.90E-01	0.0	0.0	n/a	0.0	0%
517	1	Surface	Pentachlorophenol	4.90E-01	0.0	0.0	n/a	0.0	0%
517	1	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	44%
517	1	Surface	Uranium	1.00E+02	0.0	0.0	0.0	0.0	6%
517	1	Surface	Totals		0.0	0.1	0.0	0.1	
517	1		Percent		0.1	0.9	0.0		
541	1	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	53%
541	1	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	0%
541	1	Surface	Pentachlorophenol	5.00E-01	0.0	0.0	n/a	0.0	0%
541	1	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	47%
541	1	Surface	Totals		0.0	0.1	n/a	0.1	
541	1		Percent		0.1	0.9	n/a		
561	1	Surface	Cadmium	1.83E+00	0.0	0.0	0.0	0.0	46%
561	1	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	33%
561	1	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	22%
561	1	Surface	Totals		0.0	0.0	0.0	0.0	
561	1		Percent		0.1	0.8	0.0		
561	2	Surface	1,2,3-Trichloropropane	5.90E-03	0.0	0.0	0.0	0.0	0%
561	2	Surface	Hexachlorobenzene	4.90E-01	0.0	0.0	n/a	0.0	58%
561	2	Surface	Pentachlorophenol	2.20E+00	0.0	0.0	n/a	0.0	42%
561	2	Surface	Totals		0.0	0.0	0.0	0.0	
561	2		Percent		0.1	0.9	0.0		
562	1	Surface	Antimony	8.20E+00	0.0	0.0	n/a	0.0	81%
562	1	Surface	Chromium	6.50E+01	0.0	0.0	n/a	0.0	2%
562	1	Surface	Thallium	1.95E+00	0.0	0.0	n/a	0.0	17%
562	1	Surface	Totals		0.0	0.0	n/a	0.0	
562	1		Percent		0.1	0.9	n/a		
562	2	Surface	Antimony	8.30E+00	0.0	0.0	n/a	0.0	81%
562	2	Surface	Chromium	6.50E+01	0.0	0.0	n/a	0.0	2%
562	2	Surface	Thallium	1.93E+00	0.0	0.0	n/a	0.0	17%
562	2	Surface	Totals		0.0	0.0	n/a	0.0	
562	2		Percent		0.1	0.9	n/a		
562	3	Surface	Antimony	7.72E+00	0.0	0.0	n/a	0.0	83%
562	3	Surface	Thallium	1.79E+00	0.0	0.0	n/a	0.0	17%
562	3	Surface	Totals		0.0	0.0	n/a	0.0	
562	3		Percent		0.1	0.9	n/a		
562	4	Surface	Antimony	8.13E+00	0.0	0.0	n/a	0.0	83%
562	4	Surface	Thallium	1.93E+00	0.0	0.0	n/a	0.0	17%
562	4	Surface	Totals		0.0	0.0	n/a	0.0	
562	4		Percent		0.1	0.9	n/a		

¹ = Percentage of COPC to Total

SWMU = solid waste management unit

EU = exposure unit

COPC = chemical of potential concern

EPC = exposure point concentration

HI = hazard index

n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
562	4		Percent		0.1	0.9	n/a		
562	5	Surface	Antimony	9.53E+00	0.0	0.0	n/a	0.0	85%
562	5	Surface	Thallium	1.97E+00	0.0	0.0	n/a	0.0	15%
562	5	Surface	Totals		0.0	0.0	n/a	0.0	
562	5		Percent		0.1	0.9	n/a		
563	1	Surface	Antimony	8.26E+00	0.0	0.0	n/a	0.0	83%
563	1	Surface	Thallium	1.96E+00	0.0	0.0	n/a	0.0	17%
563	1	Surface	Totals		0.0	0.0	n/a	0.0	
563	1		Percent		0.1	0.9	n/a		
563	2	Surface	Antimony	7.85E+00	0.0	0.0	n/a	0.0	81%
563	2	Surface	Chromium	6.50E+01	0.0	0.0	n/a	0.0	2%
563	2	Surface	Thallium	1.87E+00	0.0	0.0	n/a	0.0	17%
563	2	Surface	Totals		0.0	0.0	n/a	0.0	
563	2		Percent		0.1	0.9	n/a		
564	1	Surface	Antimony	8.83E+00	0.0	0.0	n/a	0.0	100%
564	1	Surface	Totals		0.0	0.0	n/a	0.0	
564	1		Percent		0.0	1.0	n/a		
567	1	Surface	Antimony	7.91E+00	0.0	0.0	n/a	0.0	48%
567	1	Surface	Cadmium	2.35E+00	0.0	0.0	0.0	0.0	1%
567	1	Surface	Thallium	9.38E+00	0.0	0.0	n/a	0.0	51%
567	1	Surface	Totals		0.0	0.0	0.0	0.0	
567	1		Percent		0.1	0.9	0.0		
567	2	Surface	1,1-Dichloroethene	4.00E-02	0.0	0.0	0.0	0.0	100%
567	2	Surface	Totals		0.0	0.0	0.0	0.0	
567	2		Percent		0.0	0.0	1.0		
567	3	Surface	Antimony	8.14E+00	0.0	0.0	n/a	0.0	50%
567	3	Surface	Cadmium	2.27E+00	0.0	0.0	0.0	0.0	1%
567	3	Surface	Thallium	9.08E+00	0.0	0.0	n/a	0.0	49%
567	3	Surface	Totals		0.0	0.0	0.0	0.0	
567	3		Percent		0.1	0.9	0.0		
567	4	Surface	Antimony	8.18E+00	0.0	0.0	n/a	0.0	48%
567	4	Surface	Cadmium	2.48E+00	0.0	0.0	0.0	0.0	1%
567	4	Surface	Thallium	9.93E+00	0.0	0.0	n/a	0.0	51%
567	4	Surface	Totals		0.0	0.0	0.0	0.0	
567	4		Percent		0.1	0.9	0.0		
14	1	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	0%
14	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	100%
14	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
14	1	Surface	Totals		0.0	0.1	n/a	0.1	
14	1		Percent		0.0	1.0	n/a		
14	2	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	2%
14	2	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	2%
14	2	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
14	2	Surface	Totals		0.0	0.0	n/a	0.0	
14	2		Percent		0.0	1.0	n/a		
14	3	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	2%
14	3	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	2%
14	3	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
14	3	Surface	Totals		0.0	0.0	n/a	0.0	
14	3		Percent		0.0	1.0	n/a		
14	4	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	56%
14	4	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	44%

1 = Percentage of COPC to Total COPC to Surface
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
14	4	Surface	Totals		0.0	0.0	n/a	0.0	
14	4		Percent		0.1	0.9	n/a		
14	5	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	56%
14	5	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	44%
14	5	Surface	Totals		0.0	0.0	n/a	0.0	
14	5		Percent		0.1	0.9	n/a		
14	6	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	57%
14	6	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	43%
14	6	Surface	Totals		0.0	0.0	n/a	0.0	
14	6		Percent		0.1	0.9	n/a		
14	7	Surface	Hexachlorobenzene	4.00E-01	0.0	0.0	n/a	0.0	3%
14	7	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	2%
14	7	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	95%
14	7	Surface	Totals		0.0	0.0	n/a	0.0	
14	7		Percent		0.0	1.0	n/a		
14	8	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	56%
14	8	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	44%
14	8	Surface	Totals		0.0	0.0	n/a	0.0	
14	8		Percent		0.1	0.9	n/a		
14	9	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	2%
14	9	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	2%
14	9	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
14	9	Surface	Totals		0.0	0.0	n/a	0.0	
14	9		Percent		0.0	1.0	n/a		
14	10	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	2%
14	10	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	2%
14	10	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
14	10	Surface	Totals		0.0	0.0	n/a	0.0	
14	10		Percent		0.0	1.0	n/a		
518	1	Surface	1,2,4-Trichlorobenzene	2.40E+00	0.0	0.0	0.0	0.0	0%
518	1	Surface	1,4-Dichlorobenzene	2.40E+00	0.0	0.0	0.0	0.0	0%
518	1	Surface	2,4-Dinitrotoluene	2.40E+00	0.0	0.0	n/a	0.0	0%
518	1	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	50%
518	1	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
518	1	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	0%
518	1	Surface	Hexachloroethane	2.40E+00	0.0	0.0	0.0	0.0	1%
518	1	Surface	Naphthalene	2.40E+00	0.0	0.0	0.0	0.0	2%
518	1	Surface	Pentachlorophenol	2.40E+00	0.0	0.0	n/a	0.0	0%
518	1	Surface	Silver	4.00E+00	0.0	0.0	n/a	0.0	2%
518	1	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	44%
518	1	Surface	Totals		0.0	0.1	0.0	0.1	
518	1		Percent		0.1	0.9	0.0		
520	1	Surface	Antimony	9.30E+00	0.0	0.0	n/a	0.0	36%
520	1	Surface	Cadmium	1.86E+00	0.0	0.0	0.0	0.0	0%
520	1	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	0%
520	1	Surface	Pentachlorophenol	1.60E+00	0.0	0.0	n/a	0.0	0%
520	1	Surface	Thallium	1.86E+01	0.0	0.0	n/a	0.0	63%
520	1	Surface	Totals		0.0	0.1	0.0	0.1	
520	1		Percent		0.1	0.9	0.0		
520	2	Surface	Antimony	2.00E+01	0.0	0.0	n/a	0.0	50%
520	2	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
520	2	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	0%

¹ = Percentage of COPC to Total COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
520	2	Surface	Pentachlorophenol	1.60E+00	0.0	0.0	n/a	0.0	0%
520	2	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	6%
520	2	Surface	Thallium	2.00E+01	0.0	0.0	n/a	0.0	44%
520	2	Surface	Totals		0.0	0.1	0.0	0.1	
520	2		Percent		0.1	0.9	0.0		
520	3	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	0%
520	3	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	100%
520	3	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
520	3	Surface	Totals		0.0	0.1	n/a	0.1	
520	3		Percent		0.0	1.0	n/a		
520	4	Surface	Hexachlorobenzene	3.40E-01	0.0	0.0	n/a	0.0	56%
520	4	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	44%
520	4	Surface	Totals		0.0	0.0	n/a	0.0	
520	4		Percent		0.1	0.9	n/a		
520	5	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	0%
520	5	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	91%
520	5	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
520	5	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
520	5	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
520	5	Surface	Totals		0.0	0.1	0.0	0.1	
520	5		Percent		0.0	1.0	0.0		
81	1	Surface	Antimony	1.31E+01	0.0	0.0	n/a	0.0	94%
81	1	Surface	Hexachlorobenzene	4.20E-01	0.0	0.0	n/a	0.0	0%
81	1	Surface	Pentachlorophenol	2.10E+00	0.0	0.0	n/a	0.0	0%
81	1	Surface	Thallium	8.00E-01	0.0	0.0	n/a	0.0	5%
81	1	Surface	Totals		0.0	0.0	n/a	0.0	
81	1		Percent		0.0	1.0	n/a		
153	1	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
153	1	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	0%
153	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	80%
153	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
153	1	Surface	Pentachlorophenol	1.90E+00	0.0	0.0	n/a	0.0	0%
153	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
153	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
153	1	Surface	Totals		0.0	0.1	0.0	0.1	
153	1		Percent		0.0	1.0	0.0		
156	1	Surface	Hexachlorobenzene	3.80E-01	0.0	0.0	n/a	0.0	2%
156	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	2%
156	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	96%
156	1	Surface	Totals		0.0	0.0	n/a	0.0	
156	1		Percent		0.0	1.0	n/a		
160	1	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
160	1	Surface	Hexachlorobenzene	3.50E-01	0.0	0.0	n/a	0.0	0%
160	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	80%
160	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
160	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
160	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
160	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
160	1	Surface	Totals		0.0	0.1	0.0	0.1	
160	1		Percent		0.0	1.0	0.0		
163	1	Surface	1,1-Dichloroethene	1.68E-01	0.0	0.0	0.0	0.0	0%
163	1	Surface	Totals		0.0	0.0	n/a	0.0	29%
163	1		Percent		0.0	0.0	n/a		

¹ = Percentage of COPC to Total

SWMU = solid waste management unit

EU = exposure unit

COPC = chemical of potential concern

EPC = exposure point concentration

HI = hazard index

n/a = not applicable

Table D7.5. HIs for the Current Industrial Worker for Nondetect Uncertainty Evaluation (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	HI	Percent ¹
163	1	Surface	Cadmium	2.00E+00	0.0	0.0	0.0	0.0	0%
163	1	Surface	Hexachlorobenzene	5.00E-01	0.0	0.0	n/a	0.0	0%
163	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	41%
163	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	6%
163	1	Surface	Pentachlorophenol	1.70E+00	0.0	0.0	n/a	0.0	0%
163	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	3%
163	1	Surface	Thallium	1.50E+01	0.0	0.0	n/a	0.0	19%
163	1	Surface	Trichloroethene	1.68E-01	0.0	0.0	0.0	0.0	0%
163	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	1%
163	1	Surface	Vinyl chloride	1.68E-01	0.0	0.0	0.0	0.0	0%
163	1	Surface	Totals		0.0	0.1	0.0	0.2	
163	1		Percent		0.1	0.9	0.0		
219	1	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
219	1	Surface	Hexachlorobenzene	3.60E-01	0.0	0.0	n/a	0.0	0%
219	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	90%
219	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
219	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	8%
219	1	Surface	Uranium	2.00E+01	0.0	0.0	0.0	0.0	2%
219	1	Surface	Totals		0.0	0.1	0.0	0.1	
219	1		Percent		0.0	1.0	0.0		
488	1	Surface	Chromium	8.50E+01	0.0	0.0	n/a	0.0	1%
488	1	Surface	Hexachlorobenzene	3.70E-01	0.0	0.0	n/a	0.0	0%
488	1	Surface	Mercury	1.00E+01	0.0	0.1	n/a	0.1	81%
488	1	Surface	Nickel	6.50E+01	0.0	0.0	0.0	0.0	11%
488	1	Surface	Pentachlorophenol	1.80E+00	0.0	0.0	n/a	0.0	0%
488	1	Surface	Silver	1.00E+01	0.0	0.0	n/a	0.0	7%
488	1	Surface	Totals		0.0	0.1	0.0	0.1	
488	1		Percent		0.0	1.0	0.0		

1 = Percentage of COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 HI = hazard index
 n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
1	1	Surface	3,3'-Dichlorobenzidine	8.90E-01	3.9E-09	3.7E-08	6.7E-15	n/a	4.1E-08	4%
1	1	Surface	Bis(2-chloroethyl) ether	4.40E-01	4.7E-09	0.0E+00	3.2E-15	n/a	4.7E-09	0%
1	1	Surface	Hexachlorobenzene	4.40E-01	6.9E-09	6.5E-08	1.4E-07	n/a	2.1E-07	19%
1	1	Surface	N-Nitroso-di-n-propylamine	4.40E-01	3.0E-08	2.8E-07	1.9E-14	n/a	3.1E-07	28%
1	1	Surface	Pentachlorophenol	2.20E+00	8.6E-09	8.1E-08	2.5E-13	n/a	9.0E-08	8%
1	1	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	42%
1	1	Surface	Totals		9.0E-08	9.0E-07	1.4E-07	n/a	1.1E-06	
1	1		Percent		8%	80%	12%	n/a		
1	2	Surface	3,3'-Dichlorobenzidine	9.30E-01	4.1E-09	3.8E-08	7.0E-15	n/a	4.3E-08	4%
1	2	Surface	Bis(2-chloroethyl) ether	4.60E-01	5.0E-09	0.0E+00	3.4E-15	n/a	5.0E-09	0%
1	2	Surface	Hexachlorobenzene	4.60E-01	7.2E-09	6.8E-08	1.5E-07	n/a	2.2E-07	20%
1	2	Surface	N-Nitroso-di-n-propylamine	4.60E-01	3.2E-08	3.0E-07	2.0E-14	n/a	3.3E-07	29%
1	2	Surface	Pentachlorophenol	2.30E+00	9.0E-09	8.5E-08	2.6E-13	n/a	9.4E-08	8%
1	2	Surface	Total PAH	4.60E-01	3.3E-08	4.0E-07	6.7E-10	n/a	4.4E-07	39%
1	2	Surface	Totals		9.0E-08	8.9E-07	1.5E-07	n/a	1.1E-06	
1	2		Percent		8%	79%	13%	n/a		
1	3	Surface	1,4-Dichlorobenzene	2.30E+00	1.2E-10	0.0E+00	5.6E-16	n/a	1.2E-10	0%
1	3	Surface	Bis(2-chloroethyl) ether	3.30E-01	3.6E-09	0.0E+00	2.4E-15	n/a	3.6E-09	0%
1	3	Surface	Cadmium	3.00E+00	n/a	n/a	1.2E-10	n/a	1.2E-10	0%
1	3	Surface	Hexachlorobenzene	2.30E+00	3.6E-08	3.4E-07	7.3E-07	n/a	1.1E-06	57%
1	3	Surface	Hexachlorobutadiene	2.30E+00	1.8E-09	1.7E-08	1.1E-15	n/a	1.8E-08	1%
1	3	Surface	Hexachloroethane	2.30E+00	9.0E-10	8.5E-09	5.6E-16	n/a	9.4E-09	0%
1	3	Surface	N-Nitroso-di-n-propylamine	3.30E-01	2.3E-08	2.1E-07	1.5E-14	n/a	2.4E-07	12%
1	3	Surface	Pentachlorophenol	2.30E+00	9.0E-09	8.5E-08	2.6E-13	n/a	9.4E-08	5%
1	3	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	24%
1	3	Surface	Totals		1.1E-07	1.1E-06	7.3E-07	n/a	1.9E-06	
1	3		Percent		6%	57%	38%	n/a		
1	4	Surface	3,3'-Dichlorobenzidine	7.80E-01	3.4E-09	3.2E-08	5.9E-15	n/a	3.6E-08	3%
1	4	Surface	Bis(2-chloroethyl) ether	3.90E-01	4.2E-09	0.0E+00	2.8E-15	n/a	4.2E-09	0%
1	4	Surface	Cadmium	1.80E+00	n/a	n/a	7.2E-11	n/a	7.2E-11	0%
1	4	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	18%
1	4	Surface	N-Nitroso-di-n-propylamine	3.90E-01	2.7E-08	2.5E-07	1.7E-14	n/a	2.8E-07	27%
1	4	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	7%
1	4	Surface	Total PAH	4.80E-01	3.4E-08	4.2E-07	6.9E-10	n/a	4.5E-07	44%
1	4	Surface	Totals		8.2E-08	8.3E-07	1.2E-07	n/a	1.0E-06	
1	4		Percent		8%	80%	12%	n/a		
1	5	Surface	3,3'-Dichlorobenzidine	8.20E-01	3.6E-09	3.4E-08	6.2E-15	n/a	3.8E-08	6%
1	5	Surface	Bis(2-chloroethyl) ether	4.10E-01	4.4E-09	0.0E+00	3.0E-15	n/a	4.4E-09	1%
1	5	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	32%
1	5	Surface	N-Nitroso-di-n-propylamine	4.10E-01	2.8E-08	2.6E-07	1.8E-14	n/a	2.9E-07	47%
1	5	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	14%
1	5	Surface	Totals		5.1E-08	4.4E-07	1.3E-07	n/a	6.2E-07	
1	5		Percent		8%	71%	21%	n/a		
99	1	Surface	Cadmium	1.94E+00	n/a	n/a	7.7E-11	n/a	7.7E-11	0%
99	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	77%
99	1	Surface	Total PAH	4.80E-01	3.4E-08	4.2E-07	6.9E-10	n/a	4.5E-07	23%
99	1	Surface	Totals		1.3E-07	1.7E-06	1.1E-07	n/a	1.9E-06	
99	1		Percent		7%	88%	6%	n/a		
194	1	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
194	1	Surface	Hexachlorobenzene	4.30E-01	6.7E-09	6.3E-08	1.4E-07	n/a	2.1E-07	11%
194	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
194	1	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
194	1	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	1		Percent		6%	81%	13%	n/a		
194	2	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	2	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
194	2	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%

SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
194	2	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	2	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	2	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	2		Percent		6%	81%	12%	n/a		
194	3	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	3	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
194	3	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	3	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	3	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	3		Percent		6%	81%	13%	n/a		
194	4	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	4	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
194	4	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	4	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	4	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	4		Percent		6%	81%	13%	n/a		
194	5	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	5	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
194	5	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	5	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	5	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	5		Percent		6%	81%	13%	n/a		
194	6	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	6	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
194	6	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	6	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	6	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	6		Percent		6%	81%	12%	n/a		
194	7	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	7	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	10%
194	7	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	7	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	7	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	7		Percent		7%	81%	12%	n/a		
194	8	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	8	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
194	8	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	8	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	8	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	8	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	8		Percent		6%	81%	13%	n/a		
194	9	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	9	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
194	9	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	9	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	9	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	9	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	9		Percent		6%	81%	13%	n/a		
194	10	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	10	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	10%
194	10	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	10	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	10	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	10		Percent		7%	81%	12%	n/a		
194	11	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	24%
194	11	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	54%
194	11	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
194	11	Surface	Totals		2.0E-08	1.9E-07	1.1E-07	n/a	3.2E-07	
194	11		Percent		6%	58%	36%	n/a		
194	12	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
194	12	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	9%
194	12	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
194	12	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
194	12	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
194	12		Percent		7%	81%	12%	n/a		
194	13	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	13	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	10%
194	13	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	13	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	13	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	13		Percent		6%	81%	13%	n/a		
194	14	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	14	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	10%
194	14	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	14	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	14	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	14	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	14		Percent		6%	81%	13%	n/a		
194	15	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	15	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	100%
194	15	Surface	Totals		9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	
194	15		Percent		7%	86%	7%	n/a		
194	16	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	16	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
194	16	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	16	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	16	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	16		Percent		6%	81%	13%	n/a		
194	17	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
194	17	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	10%
194	17	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	17	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
194	17	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
194	17	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
194	17		Percent		6%	81%	12%	n/a		
194	18	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	18	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	10%
194	18	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	18	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	18	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.9E-06	
194	18		Percent		7%	81%	13%	n/a		
194	19	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
194	19	Surface	Hexachlorobenzene	4.40E-01	6.9E-09	6.5E-08	1.4E-07	n/a	2.1E-07	11%
194	19	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
194	19	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
194	19	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
194	19		Percent		6%	80%	13%	n/a		
194	20	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	20	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
194	20	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	20	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	20	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	20		Percent		6%	81%	13%	n/a		
194	21	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%

1 = Percentage of COPC to Total

SWMU = solid waste management unit

EU = exposure unit

COPC = chemical of potential concern

EPC = exposure point concentration

ELCR = excess lifetime cancer risk

n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
194	21	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
194	21	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	21	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	21	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	21		Percent		6%	81%	12%	n/a		
194	22	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	25%
194	22	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	53%
194	22	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	22	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	22%
194	22	Surface	Totals		2.2E-08	2.0E-07	1.2E-07	n/a	3.5E-07	
194	22		Percent		6%	59%	35%	n/a		
194	23	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	23	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
194	23	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	23	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	23	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	23		Percent		6%	81%	13%	n/a		
194	24	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
194	24	Surface	Hexachlorobenzene	4.40E-01	6.9E-09	6.5E-08	1.4E-07	n/a	2.1E-07	11%
194	24	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
194	24	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
194	24	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
194	24		Percent		6%	80%	13%	n/a		
194	25	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	25	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
194	25	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	25	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	25	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
194	25		Percent		6%	81%	13%	n/a		
194	26	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	26	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
194	26	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
194	26	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	26	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	26	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	26		Percent		6%	81%	12%	n/a		
194	27	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	27	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	10%
194	27	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
194	27	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	27	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.9E-06	
194	27		Percent		7%	81%	13%	n/a		
194	28	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
194	28	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
194	28	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
194	28	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
194	28	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
194	28		Percent		6%	81%	12%	n/a		
194	29	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	5%
194	29	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	10%
194	29	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
194	29	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
194	29	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
194	29		Percent		6%	81%	12%	n/a		
194	30	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
194	30	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	10%
194	30	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%

1 = Percentage of COPC to Total
 SWMU = solid waste management unit
 EU = exposure unit
 COPC = chemical of potential concern
 EPC = exposure point concentration
 ELCR = excess lifetime cancer risk
 n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
194	30	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
194	30	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.9E-06	
194	30		Percent		7%	81%	13%	n/a		
194	31	Surface	3,3'-Dichlorobenzidine	4.70E-01	2.1E-09	1.9E-08	3.5E-15	n/a	2.2E-08	2%
194	31	Surface	Bis(2-chloroethyl) ether	4.70E-01	5.1E-09	0.0E+00	3.4E-15	n/a	5.1E-09	0%
194	31	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
194	31	Surface	Hexachlorobenzene	4.70E-01	7.4E-09	6.9E-08	1.5E-07	n/a	2.3E-07	21%
194	31	Surface	N-Nitroso-di-n-propylamine	4.70E-01	3.2E-08	3.0E-07	2.1E-14	n/a	3.3E-07	31%
194	31	Surface	PCB, Total	1.00E-01	2.0E-09	2.6E-08	2.1E-09	n/a	3.0E-08	3%
194	31	Surface	Pentachlorophenol	4.70E-01	1.8E-09	1.7E-08	5.3E-14	n/a	1.9E-08	2%
194	31	Surface	Total PAH	4.70E-01	3.4E-08	4.1E-07	6.8E-10	n/a	4.4E-07	41%
194	31	Surface	Totals		8.4E-08	8.4E-07	1.5E-07	n/a	1.1E-06	
194	31		Percent		8%	78%	14%	n/a		
196	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	5%
196	1	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	10%
196	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
196	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
196	1	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
196	1		Percent		6%	81%	12%	n/a		
196	2	Surface	Benzene	1.00E+00	5.4E-10	1.3E-08	6.7E-08	n/a	8.0E-08	100%
196	2	Surface	Totals		5.4E-10	1.3E-08	6.7E-08	n/a	8.0E-08	
196	2		Percent		1%	16%	84%	n/a		
489	1	Surface	1,2,3-Trichloropropane	5.70E-03	1.7E-09	0.0E+00	n/a	n/a	1.7E-09	0%
489	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	5%
489	1	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	10%
489	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
489	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
489	1	Surface	Trans-1,4-Dichloro-2-butene	1.10E-02	n/a	n/a	1.0E-15	n/a	1.0E-15	0%
489	1	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
489	1		Percent		7%	81%	12%	n/a		
531	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
531	1	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	9%
531	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
531	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
531	1	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
531	1		Percent		7%	81%	12%	n/a		
200	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	25%
200	1	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	53%
200	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	22%
200	1	Surface	Totals		2.1E-08	2.0E-07	1.2E-07	n/a	3.3E-07	
200	1		Percent		6%	59%	35%	n/a		
212	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	8%
212	1	Surface	Bis(2-chloroethyl) ether	3.30E-01	3.6E-09	0.0E+00	2.4E-15	n/a	3.6E-09	0%
212	1	Surface	Cadmium	1.95E+00	n/a	n/a	7.8E-11	n/a	7.8E-11	0%
212	1	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	16%
212	1	Surface	N-Nitroso-di-n-propylamine	3.30E-01	2.3E-08	2.1E-07	1.5E-14	n/a	2.4E-07	23%
212	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	7%
212	1	Surface	Total PAH	4.90E-01	3.5E-08	4.3E-07	7.1E-10	n/a	4.6E-07	46%
212	1	Surface	Totals		8.1E-08	8.2E-07	1.1E-07	n/a	1.0E-06	
212	1		Percent		8%	81%	11%	n/a		
213	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
213	1	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	53%
213	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
213	1	Surface	Totals		1.9E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
213	1		Percent		6%	59%	35%	n/a		
213	2	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	100%
213	2	Surface	Totals		9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
213	2		Percent		7%	86%	7%	n/a		
214	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	4%
214	1	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	8%
214	1	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	9%
214	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
214	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	75%
214	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
214	1	Surface	Totals		1.2E-07	1.5E-06	3.8E-07	n/a	2.0E-06	
214	1		Percent		6%	75%	19%	n/a		
215	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
215	1	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	9%
215	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
215	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
215	1	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
215	1		Percent		7%	81%	12%	n/a		
216	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	5%
216	1	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	10%
216	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
216	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
216	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
216	1	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
216	1		Percent		6%	81%	12%	n/a		
217	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
217	1	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	10%
217	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
217	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
217	1	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
217	1		Percent		6%	81%	12%	n/a		
217	2	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
217	2	Surface	Bis(2-chloroethyl) ether	3.70E-01	4.0E-09	0.0E+00	2.7E-15	n/a	4.0E-09	0%
217	2	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
217	2	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	8%
217	2	Surface	N-Nitroso-di-n-propylamine	3.70E-01	2.5E-08	2.4E-07	1.6E-14	n/a	2.6E-07	13%
217	2	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	71%
217	2	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
217	2	Surface	Totals		1.5E-07	1.7E-06	2.2E-07	n/a	2.1E-06	
217	2		Percent		7%	82%	11%	n/a		
221	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
221	1	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	53%
221	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
221	1	Surface	Totals		2.0E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
221	1		Percent		6%	59%	35%	n/a		
222	1	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	25%
222	1	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	53%
222	1	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	22%
222	1	Surface	Totals		2.3E-08	2.2E-07	1.3E-07	n/a	3.7E-07	
222	1		Percent		6%	59%	35%	n/a		
227	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	10%
227	1	Surface	Bis(2-chloroethyl) ether	5.00E-01	5.4E-09	0.0E+00	3.6E-15	n/a	5.4E-09	1%
227	1	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
227	1	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	32%
227	1	Surface	N-Nitroso-di-n-propylamine	5.00E-01	3.4E-08	3.2E-07	2.2E-14	n/a	3.6E-07	48%
227	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	9%
227	1	Surface	Totals		6.2E-08	5.3E-07	1.6E-07	n/a	7.5E-07	
227	1		Percent		8%	71%	21%	n/a		
227	2	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	12%
227	2	Surface	Bis(2-chloroethyl) ether	4.80E-01	5.2E-09	0.0E+00	3.5E-15	n/a	5.2E-09	1%

1 = Percentage of COPC to Total

SWMU = solid waste management unit

EU = exposure unit

COPC = chemical of potential concern

EPC = exposure point concentration

ELCR = excess lifetime cancer risk

n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
227	2	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
227	2	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	25%
227	2	Surface	N-Nitroso-di-n-propylamine	4.80E-01	3.3E-08	3.1E-07	2.1E-14	n/a	3.4E-07	52%
227	2	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	11%
227	2	Surface	Totals		5.8E-08	4.9E-07	1.1E-07	n/a	6.6E-07	
227	2		Percent		9%	75%	16%	n/a		
228	1	Surface	3,3'-Dichlorobenzidine	1.60E+00	7.0E-09	6.6E-08	1.2E-14	n/a	7.3E-08	4%
228	1	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	9%
228	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
228	1	Surface	Pentachlorophenol	1.60E+00	6.3E-09	5.9E-08	1.8E-13	n/a	6.5E-08	4%
228	1	Surface	Totals		1.2E-07	1.5E-06	2.1E-07	n/a	1.8E-06	
228	1		Percent		6%	82%	12%	n/a		
76	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	17%
76	1	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	32%
76	1	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	35%
76	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
76	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	15%
76	1	Surface	Totals		2.1E-08	1.9E-07	2.7E-07	n/a	4.9E-07	
76	1		Percent		4%	40%	56%	n/a		
165	1	Surface	1,1-Dichloroethene	6.10E-01	3.6E-09	8.4E-08	6.1E-07	n/a	7.0E-07	30%
165	1	Surface	1,2-Dichloroethane	6.10E-01	5.4E-10	0.0E+00	3.5E-16	n/a	5.4E-10	0%
165	1	Surface	3,3'-Dichlorobenzidine	7.50E-01	3.3E-09	3.1E-08	5.6E-15	n/a	3.4E-08	1%
165	1	Surface	Benzene	6.10E-01	3.3E-10	7.7E-09	4.1E-08	n/a	4.9E-08	2%
165	1	Surface	Bis(2-chloroethyl) ether	3.70E-01	4.0E-09	0.0E+00	2.7E-15	n/a	4.0E-09	0%
165	1	Surface	Cadmium	5.00E+00	n/a	n/a	2.0E-10	n/a	2.0E-10	0%
165	1	Surface	Carbon tetrachloride	6.10E-01	4.2E-10	9.8E-09	5.9E-08	n/a	6.9E-08	3%
165	1	Surface	Chloroform	6.10E-01	1.9E-10	4.3E-09	1.4E-07	n/a	1.4E-07	6%
165	1	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	8%
165	1	Surface	N-Nitroso-di-n-propylamine	3.70E-01	2.5E-08	2.4E-07	1.6E-14	n/a	2.6E-07	11%
165	1	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	3%
165	1	Surface	Tetrachloroethene	6.10E-01	3.2E-09	7.6E-08	4.2E-08	n/a	1.2E-07	5%
165	1	Surface	Trichloroethene	6.10E-01	1.9E-09	4.5E-08	6.8E-07	n/a	7.3E-07	31%
165	1	Surface	Totals		5.6E-08	6.2E-07	1.7E-06	n/a	2.4E-06	
165	1		Percent		2%	26%	71%	n/a		
170	1	Surface	PCB, Total	1.00E-01	2.0E-09	2.6E-08	2.1E-09	n/a	3.0E-08	100%
170	1	Surface	Totals		2.0E-09	2.6E-08	2.1E-09	n/a	3.0E-08	
170	1		Percent		7%	86%	7%	n/a		
158	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	5%
158	1	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	10%
158	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
158	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
158	1	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
158	1		Percent		6%	81%	12%	n/a		
169	1	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	25%
169	1	Surface	Cadmium	1.10E+00	n/a	n/a	4.4E-11	n/a	4.4E-11	0%
169	1	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	53%
169	1	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	22%
169	1	Surface	Totals		2.2E-08	2.0E-07	1.2E-07	n/a	3.5E-07	
169	1		Percent		6%	59%	35%	n/a		
19	1	Surface	Chromium	2.96E+01	n/a	n/a	5.5E-08	n/a	5.5E-08	85%
19	1	Surface	Cobalt	4.76E+01	n/a	n/a	9.5E-09	n/a	9.5E-09	15%
19	1	Surface	Totals		n/a	n/a	6.4E-08	n/a	6.4E-08	
19	1		Percent		n/a	n/a	1.0E+00	n/a		
138	1	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	6%
138	1	Surface	Hexachlorobenzene	4.30E-01	6.7E-09	6.3E-08	1.4E-07	n/a	2.1E-07	13%
138	1	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
138	1	Surface	Trichloroethene	1.00E+00	3.2E-09	7.4E-08	1.1E-06	n/a	1.2E-06	75%

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
138	1	Surface	Totals		2.7E-08	3.0E-07	1.3E-06	n/a	1.6E-06	
138	1		Percent		1.7E-02	1.9E-01	7.9E-01	n/a		
138	2	Surface	1,1-Dichloroethene	1.00E+00	5.9E-09	1.4E-07	1.0E-06	n/a	1.1E-06	30%
138	2	Surface	1,2-Dichloroethane	1.00E+00	8.9E-10	0.0E+00	5.7E-16	n/a	8.9E-10	0%
138	2	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	2%
138	2	Surface	Benzene	1.00E+00	5.4E-10	1.3E-08	6.7E-08	n/a	8.0E-08	2%
138	2	Surface	Carbon tetrachloride	1.00E+00	6.8E-10	1.6E-08	9.6E-08	n/a	1.1E-07	3%
138	2	Surface	Chloroform	1.00E+00	3.0E-10	7.1E-09	2.3E-07	n/a	2.3E-07	6%
138	2	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	4%
138	2	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	5%
138	2	Surface	Naphthalene	2.50E+00	n/a	n/a	6.3E-08	n/a	6.3E-08	2%
138	2	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	2%
138	2	Surface	Tetrachloroethene	1.00E+00	5.3E-09	1.2E-07	6.9E-08	n/a	2.0E-07	5%
138	2	Surface	Trichloroethene	1.00E+00	3.2E-09	7.4E-08	1.1E-06	n/a	1.2E-06	31%
138	2	Surface	Vinyl chloride	1.10E+00	7.7E-09	1.8E-07	1.1E-07	n/a	3.0E-07	8%
138	2	Surface	Totals		4.5E-08	7.5E-07	3.0E-06	n/a	3.8E-06	
138	2		Percent		1.2E-02	2.0E-01	7.9E-01	n/a		
180	1	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
180	1	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
180	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
180	1	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
180	1	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
180	1		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
180	2	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
180	2	Surface	Hexachlorobenzene	4.40E-01	6.9E-09	6.5E-08	1.4E-07	n/a	2.1E-07	11%
180	2	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
180	2	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
180	2	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
180	2		Percent		6.5E-02	8.0E-01	1.3E-01	n/a		
180	3	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
180	3	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
180	3	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
180	3	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
180	3	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
180	3		Percent		6.5E-02	8.1E-01	1.2E-01	n/a		
180	4	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
180	4	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
180	4	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
180	4	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
180	4	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
180	4		Percent		6.5E-02	8.1E-01	1.2E-01	n/a		
181	1	Surface	Cadmium	2.49E+00	n/a	n/a	9.9E-11	n/a	9.9E-11	0%
181	1	Surface	PCB, Total	1.30E-01	2.5E-09	3.3E-08	2.8E-09	n/a	3.9E-08	100%
181	1	Surface	Totals		2.5E-09	3.3E-08	2.9E-09	n/a	3.9E-08	
181	1		Percent		6.5E-02	8.6E-01	7.4E-02	n/a		
195	1	Surface	3,3'-Dichlorobenzidine	2.20E+00	9.7E-09	9.1E-08	1.7E-14	n/a	1.0E-07	5%
195	1	Surface	Hexachlorobenzene	4.50E-01	7.0E-09	6.6E-08	1.4E-07	n/a	2.2E-07	11%
195	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	1	Surface	Pentachlorophenol	2.20E+00	8.6E-09	8.1E-08	2.5E-13	n/a	9.0E-08	5%
195	1	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
195	1		Percent		6.5E-02	8.0E-01	1.3E-01	n/a		
195	2	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
195	2	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	11%
195	2	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
195	2	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
195	2	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
195	2	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
195	2		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	3	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
195	3	Surface	Hexachlorobenzene	4.30E-01	6.7E-09	6.3E-08	1.4E-07	n/a	2.1E-07	11%
195	3	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	3	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
195	3	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	3		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	4	Surface	3,3'-Dichlorobenzidine	2.20E+00	9.7E-09	9.1E-08	1.7E-14	n/a	1.0E-07	5%
195	4	Surface	Hexachlorobenzene	4.50E-01	7.0E-09	6.6E-08	1.4E-07	n/a	2.2E-07	11%
195	4	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	4	Surface	Pentachlorophenol	2.20E+00	8.6E-09	8.1E-08	2.5E-13	n/a	9.0E-08	5%
195	4	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
195	4		Percent		6.5E-02	8.0E-01	1.3E-01	n/a		
195	5	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
195	5	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
195	5	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
195	5	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
195	5	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	5		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	6	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
195	6	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
195	6	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
195	6	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
195	6	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	6		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	7	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
195	7	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
195	7	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
195	7	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
195	7	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
195	7	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	7		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	8	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
195	8	Surface	Hexachlorobenzene	4.40E-01	6.9E-09	6.5E-08	1.4E-07	n/a	2.1E-07	11%
195	8	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	8	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
195	8	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
195	8		Percent		6.5E-02	8.0E-01	1.3E-01	n/a		
195	9	Surface	3,3'-Dichlorobenzidine	2.20E+00	9.7E-09	9.1E-08	1.7E-14	n/a	1.0E-07	5%
195	9	Surface	Hexachlorobenzene	4.60E-01	7.2E-09	6.8E-08	1.5E-07	n/a	2.2E-07	12%
195	9	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	78%
195	9	Surface	Pentachlorophenol	2.20E+00	8.6E-09	8.1E-08	2.5E-13	n/a	9.0E-08	5%
195	9	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
195	9		Percent		6.5E-02	8.0E-01	1.3E-01	n/a		
195	10	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
195	10	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
195	10	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
195	10	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
195	10	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	10		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	11	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%
195	11	Surface	Hexachlorobenzene	4.30E-01	6.7E-09	6.3E-08	1.4E-07	n/a	2.1E-07	11%
195	11	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	11	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
195	11	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	11		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	12	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	5%

¹ = Percentage of COPC to Total

SWMU = solid waste management unit

EU = exposure unit

COPC = chemical of potential concern

EPC = exposure point concentration

ELCR = excess lifetime cancer risk

n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
195	12	Surface	Hexachlorobenzene	4.30E-01	6.7E-09	6.3E-08	1.4E-07	n/a	2.1E-07	11%
195	12	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	12	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	5%
195	12	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	12		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	13	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
195	13	Surface	Hexachlorobenzene	3.90E-01	6.1E-09	5.7E-08	1.2E-07	n/a	1.9E-07	10%
195	13	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
195	13	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
195	13	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
195	13		Percent		6.5E-02	8.1E-01	1.2E-01	n/a		
195	14	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	5%
195	14	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	11%
195	14	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	80%
195	14	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	4%
195	14	Surface	Totals		1.2E-07	1.5E-06	2.4E-07	n/a	1.9E-06	
195	14		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	15	Surface	3,3'-Dichlorobenzidine	2.20E+00	9.7E-09	9.1E-08	1.7E-14	n/a	1.0E-07	5%
195	15	Surface	Hexachlorobenzene	4.50E-01	7.0E-09	6.6E-08	1.4E-07	n/a	2.2E-07	11%
195	15	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
195	15	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	79%
195	15	Surface	Pentachlorophenol	2.20E+00	8.6E-09	8.1E-08	2.5E-13	n/a	9.0E-08	5%
195	15	Surface	Totals		1.2E-07	1.5E-06	2.5E-07	n/a	1.9E-06	
195	15		Percent		6.5E-02	8.0E-01	1.3E-01	n/a		
195	16	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	5%
195	16	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	10%
195	16	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	81%
195	16	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	4%
195	16	Surface	Totals		1.2E-07	1.5E-06	2.3E-07	n/a	1.8E-06	
195	16		Percent		6.5E-02	8.1E-01	1.3E-01	n/a		
195	17	Surface	3,3'-Dichlorobenzidine	2.00E+00	8.8E-09	8.3E-08	1.5E-14	n/a	9.2E-08	25%
195	17	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	53%
195	17	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	22%
195	17	Surface	Totals		2.3E-08	2.2E-07	1.3E-07	n/a	3.7E-07	
195	17		Percent		6.2E-02	5.9E-01	3.5E-01	n/a		
492	1	Surface	3,3'-Dichlorobenzidine	8.20E-01	3.6E-09	3.4E-08	6.2E-15	n/a	3.8E-08	3%
492	1	Surface	Bis(2-chloroethyl) ether	4.10E-01	4.4E-09	0.0E+00	3.0E-15	n/a	4.4E-09	0%
492	1	Surface	Hexachlorobenzene	4.10E-01	6.4E-09	6.0E-08	1.3E-07	n/a	2.0E-07	18%
492	1	Surface	N-Nitroso-di-n-propylamine	4.10E-01	2.8E-08	2.6E-07	1.8E-14	n/a	2.9E-07	27%
492	1	Surface	Pentachlorophenol	2.00E+00	7.8E-09	7.4E-08	2.3E-13	n/a	8.1E-08	8%
492	1	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	44%
492	1	Surface	Totals		8.6E-08	8.7E-07	1.3E-07	n/a	1.1E-06	
492	1		Percent		7.9E-02	8.0E-01	1.2E-01	n/a		
493	1	Surface	3,3'-Dichlorobenzidine	5.00E-01	2.2E-09	2.1E-08	3.8E-15	n/a	2.3E-08	4%
493	1	Surface	Bis(2-chloroethyl) ether	5.00E-01	5.4E-09	0.0E+00	3.6E-15	n/a	5.4E-09	1%
493	1	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
493	1	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	37%
493	1	Surface	N-Nitroso-di-n-propylamine	5.00E-01	3.4E-08	3.2E-07	2.2E-14	n/a	3.6E-07	55%
493	1	Surface	Pentachlorophenol	5.00E-01	2.0E-09	1.8E-08	5.6E-14	n/a	2.0E-08	3%
493	1	Surface	Totals		5.2E-08	4.3E-07	1.6E-07	n/a	6.4E-07	
493	1		Percent		8.0E-02	6.7E-01	2.5E-01	n/a		
517	1	Surface	3,3'-Dichlorobenzidine	4.90E-01	2.2E-09	2.0E-08	3.7E-15	n/a	2.2E-08	2%
517	1	Surface	Bis(2-chloroethyl) ether	4.90E-01	5.3E-09	0.0E+00	3.6E-15	n/a	5.3E-09	0%
517	1	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
517	1	Surface	Hexachlorobenzene	4.90E-01	7.7E-09	7.2E-08	1.6E-07	n/a	2.3E-07	21%
517	1	Surface	N-Nitroso-di-n-propylamine	4.90E-01	3.4E-08	3.2E-07	2.2E-14	n/a	3.5E-07	32%
517	1	Surface	Pentachlorophenol	4.90E-01	1.9E-09	1.8E-08	5.5E-14	n/a	2.0E-08	2%

1 = Percentage of COPC to Total

SWMU = solid waste management unit

EU = exposure unit

COPC = chemical of potential concern

EPC = exposure point concentration

ELCR = excess lifetime cancer risk

n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
517	1	Surface	Total PAH	4.90E-01	3.5E-08	4.3E-07	7.1E-10	n/a	4.6E-07	42%
517	1	Surface	Totals		8.6E-08	8.5E-07	1.6E-07	n/a	1.1E-06	
517	1		Percent		7.8E-02	7.8E-01	1.4E-01	n/a		
541	1	Surface	3,3'-Dichlorobenzidine	5.00E-01	2.2E-09	2.1E-08	3.8E-15	n/a	2.3E-08	4%
541	1	Surface	Bis(2-chloroethyl) ether	5.00E-01	5.4E-09	0.0E+00	3.6E-15	n/a	5.4E-09	1%
541	1	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	37%
541	1	Surface	N-Nitroso-di-n-propylamine	5.00E-01	3.4E-08	3.2E-07	2.2E-14	n/a	3.6E-07	55%
541	1	Surface	Pentachlorophenol	5.00E-01	2.0E-09	1.8E-08	5.6E-14	n/a	2.0E-08	3%
541	1	Surface	Totals		5.2E-08	4.3E-07	1.6E-07	n/a	6.4E-07	
541	1		Percent		8.0E-02	6.7E-01	2.5E-01	n/a		
561	1	Surface	3,3'-Dichlorobenzidine	2.10E+00	9.2E-09	8.7E-08	1.6E-14	n/a	9.6E-08	13%
561	1	Surface	Bis(2-chloroethyl) ether	4.40E-01	4.7E-09	0.0E+00	3.2E-15	n/a	4.7E-09	1%
561	1	Surface	Cadmium	1.83E+00	n/a	n/a	7.3E-11	n/a	7.3E-11	0%
561	1	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	32%
561	1	Surface	N-Nitroso-di-n-propylamine	4.40E-01	3.0E-08	2.8E-07	1.9E-14	n/a	3.1E-07	42%
561	1	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	12%
561	1	Surface	Totals		6.0E-08	5.2E-07	1.6E-07	n/a	7.4E-07	
561	1		Percent		8.1E-02	7.0E-01	2.1E-01	n/a		
561	2	Surface	1,2,3-Trichloropropane	5.90E-03	1.7E-09	0.0E+00	n/a	n/a	1.7E-09	0%
561	2	Surface	3,3'-Dichlorobenzidine	2.20E+00	9.7E-09	9.1E-08	1.7E-14	n/a	1.0E-07	14%
561	2	Surface	Bis(2-chloroethyl) ether	4.40E-01	4.7E-09	0.0E+00	3.2E-15	n/a	4.7E-09	1%
561	2	Surface	Hexachlorobenzene	4.90E-01	7.7E-09	7.2E-08	1.6E-07	n/a	2.3E-07	32%
561	2	Surface	N-Nitroso-di-n-propylamine	4.40E-01	3.0E-08	2.8E-07	1.9E-14	n/a	3.1E-07	42%
561	2	Surface	Pentachlorophenol	2.20E+00	8.6E-09	8.1E-08	2.5E-13	n/a	9.0E-08	12%
561	2	Surface	Trans-1,4-Dichloro-2-butene	1.20E-02	n/a	n/a	1.1E-15	n/a	1.1E-15	0%
561	2	Surface	Totals		6.3E-08	5.3E-07	1.6E-07	n/a	7.5E-07	
561	2		Percent		8.4E-02	7.1E-01	2.1E-01	n/a		
562	1	Surface	Chromium	6.50E+01	n/a	n/a	1.2E-07	n/a	1.2E-07	14%
562	1	Surface	PCB, Total	1.00E+00	2.0E-08	2.6E-07	2.1E-08	n/a	3.0E-07	34%
562	1	Surface	Total PAH	4.90E-01	3.5E-08	4.3E-07	7.1E-10	n/a	4.6E-07	53%
562	1	Surface	Totals		5.5E-08	6.9E-07	1.4E-07	n/a	8.8E-07	
562	1		Percent		6.2E-02	7.8E-01	1.6E-01	n/a		
562	2	Surface	Chromium	6.50E+01	n/a	n/a	1.2E-07	n/a	1.2E-07	20%
562	2	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	80%
562	2	Surface	Totals		3.6E-08	4.4E-07	1.2E-07	n/a	5.9E-07	
562	2		Percent		6.0E-02	7.4E-01	2.0E-01	n/a		
562	4	Surface	PCB, Total	1.00E+00	2.0E-08	2.6E-07	2.1E-08	n/a	3.0E-07	39%
562	4	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	61%
562	4	Surface	Totals		5.5E-08	6.9E-07	2.2E-08	n/a	7.7E-07	
562	4		Percent		7.2E-02	9.0E-01	2.9E-02	n/a		
562	5		Percent		n/a	n/a	n/a	n/a		
563	1	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	100%
563	1	Surface	Totals		3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	
563	1		Percent		7.6E-02	9.2E-01	1.5E-03	n/a		
563	2	Surface	Chromium	6.50E+01	n/a	n/a	1.2E-07	n/a	1.2E-07	14%
563	2	Surface	PCB, Total	1.00E+00	2.0E-08	2.6E-07	2.1E-08	n/a	3.0E-07	33%
563	2	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	53%
563	2	Surface	Totals		5.5E-08	6.9E-07	1.4E-07	n/a	8.9E-07	
563	2		Percent		6.2E-02	7.8E-01	1.6E-01	n/a		
564	1	Surface	Total PAH	4.90E-01	3.5E-08	4.3E-07	7.1E-10	n/a	4.6E-07	100%
564	1	Surface	Totals		3.5E-08	4.3E-07	7.1E-10	n/a	4.6E-07	
564	1		Percent		7.6E-02	9.2E-01	1.5E-03	n/a		
567	1	Surface	Cadmium	2.35E+00	n/a	n/a	9.3E-11	n/a	9.3E-11	0%
567	1	Surface	PCB, Total	1.30E-01	2.5E-09	3.3E-08	2.8E-09	n/a	3.9E-08	8%
567	1	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	92%
567	1	Surface	Totals		3.8E-08	4.7E-07	3.6E-09	n/a	5.1E-07	
567	1		Percent		7.5E-02	9.2E-01	7.0E-03	n/a		

¹ = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or µCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
567	2	Surface	1,1-Dichloroethene	4.00E-02	2.3E-10	5.5E-09	4.0E-08	n/a	4.6E-08	100%
567	2	Surface	Totals		2.3E-10	5.5E-09	4.0E-08	n/a	4.6E-08	
567	2		Percent		5.1E-03	1.2E-01	8.7E-01	n/a		
567	3	Surface	Cadmium	2.27E+00	n/a	n/a	9.0E-11	n/a	9.0E-11	0%
567	3	Surface	PCB, Total	1.30E-01	2.5E-09	3.3E-08	2.8E-09	n/a	3.9E-08	8%
567	3	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	92%
567	3	Surface	Totals		3.8E-08	4.7E-07	3.6E-09	n/a	5.1E-07	
567	3		Percent		7.5E-02	9.2E-01	7.0E-03	n/a		
567	4	Surface	Cadmium	2.48E+00	n/a	n/a	9.9E-11	n/a	9.9E-11	0%
567	4	Surface	PCB, Total	1.30E-01	2.5E-09	3.3E-08	2.8E-09	n/a	3.9E-08	8%
567	4	Surface	Total PAH	5.00E-01	3.6E-08	4.4E-07	7.2E-10	n/a	4.7E-07	92%
567	4	Surface	Totals		3.8E-08	4.7E-07	3.6E-09	n/a	5.1E-07	
567	4		Percent		7.5E-02	9.2E-01	7.0E-03	n/a		
14	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
14	1	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	53%
14	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	1	Surface	Totals		1.9E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
14	1		Percent		6.3E-02	5.9E-01	3.5E-01	n/a		
14	2	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
14	2	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	53%
14	2	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	2	Surface	Totals		1.9E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
14	2		Percent		6.3E-02	5.9E-01	3.5E-01	n/a		
14	3	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
14	3	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	53%
14	3	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	3	Surface	Totals		1.9E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
14	3		Percent		6.3E-02	5.9E-01	3.5E-01	n/a		
14	4	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	25%
14	4	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	53%
14	4	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	22%
14	4	Surface	Totals		2.1E-08	2.0E-07	1.2E-07	n/a	3.3E-07	
14	4		Percent		6.2E-02	5.9E-01	3.5E-01	n/a		
14	5	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	25%
14	5	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	53%
14	5	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	22%
14	5	Surface	Totals		2.1E-08	1.9E-07	1.1E-07	n/a	3.3E-07	
14	5		Percent		6.3E-02	5.9E-01	3.5E-01	n/a		
14	6	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	24%
14	6	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	54%
14	6	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	6	Surface	Totals		2.0E-08	1.9E-07	1.1E-07	n/a	3.2E-07	
14	6		Percent		6.2E-02	5.8E-01	3.6E-01	n/a		
14	7	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	24%
14	7	Surface	Hexachlorobenzene	4.00E-01	6.3E-09	5.9E-08	1.3E-07	n/a	1.9E-07	54%
14	7	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	22%
14	7	Surface	Totals		2.2E-08	2.1E-07	1.3E-07	n/a	3.6E-07	
14	7		Percent		6.2E-02	5.8E-01	3.6E-01	n/a		
14	8	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
14	8	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	53%
14	8	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	8	Surface	Totals		2.0E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
14	8		Percent		6.2E-02	5.9E-01	3.5E-01	n/a		
14	9	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
14	9	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	53%
14	9	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	9	Surface	Totals		2.0E-08	1.8E-07	1.1E-07	n/a	3.1E-07	

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
14	9		Percent		6.2E-02	5.9E-01	3.5E-01	n/a		
14	10	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	25%
14	10	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	53%
14	10	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	22%
14	10	Surface	Totals		2.0E-08	1.8E-07	1.1E-07	n/a	3.1E-07	
14	10		Percent		6.2E-02	5.9E-01	3.5E-01	n/a		
518	1	Surface	1,2,4-Trichlorobenzene	2.40E+00	6.8E-10	0.0E+00	n/a	n/a	6.8E-10	0%
518	1	Surface	1,4-Dichlorobenzene	2.40E+00	1.3E-10	0.0E+00	5.8E-16	n/a	1.3E-10	0%
518	1	Surface	2,4-Dinitrotoluene	2.40E+00	7.3E-09	7.0E-08	4.7E-15	n/a	7.7E-08	3%
518	1	Surface	3,3'-Dichlorobenzidine	2.40E+00	1.1E-08	9.9E-08	1.8E-14	n/a	1.1E-07	5%
518	1	Surface	Bis(2-chloroethyl) ether	2.40E+00	2.6E-08	0.0E+00	1.7E-14	n/a	2.6E-08	1%
518	1	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
518	1	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	10%
518	1	Surface	Hexachloroethane	2.40E+00	9.4E-10	8.8E-09	5.8E-16	n/a	9.8E-09	0%
518	1	Surface	Naphthalene	2.40E+00	n/a	n/a	6.0E-08	n/a	6.0E-08	3%
518	1	Surface	N-Nitroso-di-n-propylamine	2.40E+00	1.6E-07	1.5E-06	1.1E-13	n/a	1.7E-06	73%
518	1	Surface	Pentachlorophenol	2.40E+00	9.4E-09	8.8E-08	2.7E-13	n/a	9.8E-08	4%
518	1	Surface	Totals		2.3E-07	1.9E-06	2.2E-07	n/a	2.3E-06	
518	1		Percent		9.7E-02	8.1E-01	9.4E-02	n/a		
520	1	Surface	3,3'-Dichlorobenzidine	1.60E+00	7.0E-09	6.6E-08	1.2E-14	n/a	7.3E-08	4%
520	1	Surface	Cadmium	1.86E+00	n/a	n/a	7.4E-11	n/a	7.4E-11	0%
520	1	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	9%
520	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
520	1	Surface	Pentachlorophenol	1.60E+00	6.3E-09	5.9E-08	1.8E-13	n/a	6.5E-08	4%
520	1	Surface	Totals		1.2E-07	1.5E-06	2.1E-07	n/a	1.8E-06	
520	1		Percent		6.5E-02	8.2E-01	1.2E-01	n/a		
520	2	Surface	3,3'-Dichlorobenzidine	1.60E+00	7.0E-09	6.6E-08	1.2E-14	n/a	7.3E-08	3%
520	2	Surface	Bis(2-chloroethyl) ether	5.00E-01	5.4E-09	0.0E+00	3.6E-15	n/a	5.4E-09	0%
520	2	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
520	2	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	11%
520	2	Surface	N-Nitroso-di-n-propylamine	5.00E-01	3.4E-08	3.2E-07	2.2E-14	n/a	3.6E-07	16%
520	2	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	67%
520	2	Surface	Pentachlorophenol	1.60E+00	6.3E-09	5.9E-08	1.8E-13	n/a	6.5E-08	3%
520	2	Surface	Totals		1.6E-07	1.8E-06	2.6E-07	n/a	2.2E-06	
520	2		Percent		7.1E-02	8.1E-01	1.2E-01	n/a		
520	3	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
520	3	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	9%
520	3	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
520	3	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
520	3	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
520	3		Percent		6.5E-02	8.1E-01	1.2E-01	n/a		
520	4	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
520	4	Surface	Hexachlorobenzene	3.40E-01	5.3E-09	5.0E-08	1.1E-07	n/a	1.6E-07	9%
520	4	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	83%
520	4	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
520	4	Surface	Totals		1.2E-07	1.5E-06	2.1E-07	n/a	1.8E-06	
520	4		Percent		6.5E-02	8.2E-01	1.2E-01	n/a		
520	5	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	5%
520	5	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	9%
520	5	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	82%
520	5	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
520	5	Surface	Totals		1.2E-07	1.5E-06	2.2E-07	n/a	1.8E-06	
520	5		Percent		6.5E-02	8.1E-01	1.2E-01	n/a		
81	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	12%
81	1	Surface	Bis(2-chloroethyl) ether	4.20E-01	4.5E-09	0.0E+00	3.1E-15	n/a	4.5E-09	1%
81	1	Surface	Hexachlorobenzene	4.20E-01	6.6E-09	6.2E-08	1.3E-07	n/a	2.0E-07	30%
81	1	Surface	N-Nitroso-di-n-propylamine	4.20E-01	2.9E-08	2.7E-07	1.9E-14	n/a	3.0E-07	45%

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

Table D7.6. ELCR for the Current Industrial Worker (Continued)

SWMU	EU	Depth	COPC	EPC (mg/kg or pCi/g)	Ingestion	Dermal	Inhalation	External Exposure	ELCR	Percent ¹
81	1	Surface	Pentachlorophenol	2.10E+00	8.2E-09	7.7E-08	2.4E-13	n/a	8.5E-08	13%
81	1	Surface	Totals		5.6E-08	4.8E-07	1.3E-07	n/a	6.7E-07	
81	1		Percent		8.3E-02	7.2E-01	2.0E-01	n/a		
153	1	Surface	3,3'-Dichlorobenzidine	1.90E+00	8.4E-09	7.9E-08	1.4E-14	n/a	8.7E-08	17%
153	1	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	31%
153	1	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	36%
153	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
153	1	Surface	Pentachlorophenol	1.90E+00	7.4E-09	7.0E-08	2.1E-13	n/a	7.7E-08	15%
153	1	Surface	Totals		2.2E-08	2.0E-07	2.8E-07	n/a	5.0E-07	
153	1		Percent		4.3E-02	4.1E-01	5.5E-01	n/a		
156	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	24%
156	1	Surface	Hexachlorobenzene	3.80E-01	5.9E-09	5.6E-08	1.2E-07	n/a	1.8E-07	54%
156	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	22%
156	1	Surface	Totals		2.1E-08	2.0E-07	1.2E-07	n/a	3.4E-07	
156	1		Percent		6.2E-02	5.8E-01	3.6E-01	n/a		
160	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	4%
160	1	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	8%
160	1	Surface	Hexachlorobenzene	3.50E-01	5.5E-09	5.2E-08	1.1E-07	n/a	1.7E-07	9%
160	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
160	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	76%
160	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	4%
160	1	Surface	Totals		1.2E-07	1.5E-06	3.8E-07	n/a	2.0E-06	
160	1		Percent		6.0E-02	7.5E-01	1.9E-01	n/a		
163	1	Surface	1,1-Dichloroethene	1.68E-01	9.9E-10	2.3E-08	1.7E-07	n/a	1.9E-07	7%
163	1	Surface	3,3'-Dichlorobenzidine	1.70E+00	7.5E-09	7.0E-08	1.3E-14	n/a	7.8E-08	3%
163	1	Surface	Bis(2-chloroethyl) ether	5.00E-01	5.4E-09	0.0E+00	3.6E-15	n/a	5.4E-09	0%
163	1	Surface	Cadmium	2.00E+00	n/a	n/a	8.0E-11	n/a	8.0E-11	0%
163	1	Surface	Hexachlorobenzene	5.00E-01	7.8E-09	7.4E-08	1.6E-07	n/a	2.4E-07	9%
163	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
163	1	Surface	N-Nitroso-di-n-propylamine	5.00E-01	3.4E-08	3.2E-07	2.2E-14	n/a	3.6E-07	13%
163	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	56%
163	1	Surface	Pentachlorophenol	1.70E+00	6.7E-09	6.3E-08	1.9E-13	n/a	6.9E-08	3%
163	1	Surface	Trichloroethene	1.68E-01	5.3E-10	1.2E-08	1.9E-07	n/a	2.0E-07	7%
163	1	Surface	Vinyl chloride	1.68E-01	1.2E-09	2.8E-08	1.7E-08	n/a	4.6E-08	2%
163	1	Surface	Totals		1.6E-07	1.9E-06	6.4E-07	n/a	2.7E-06	
163	1		Percent		6.1E-02	7.0E-01	2.4E-01	n/a		
219	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	4%
219	1	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	8%
219	1	Surface	Hexachlorobenzene	3.60E-01	5.6E-09	5.3E-08	1.1E-07	n/a	1.7E-07	9%
219	1	Surface	PCB, Total	5.00E+00	9.8E-08	1.3E-06	1.1E-07	n/a	1.5E-06	75%
219	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	4%
219	1	Surface	Totals		1.2E-07	1.5E-06	3.8E-07	n/a	2.0E-06	
219	1		Percent		6.0E-02	7.5E-01	1.9E-01	n/a		
488	1	Surface	3,3'-Dichlorobenzidine	1.80E+00	7.9E-09	7.5E-08	1.4E-14	n/a	8.2E-08	17%
488	1	Surface	Chromium	8.50E+01	n/a	n/a	1.6E-07	n/a	1.6E-07	32%
488	1	Surface	Hexachlorobenzene	3.70E-01	5.8E-09	5.4E-08	1.2E-07	n/a	1.8E-07	36%
488	1	Surface	Nickel	6.50E+01	n/a	n/a	3.7E-10	n/a	3.7E-10	0%
488	1	Surface	Pentachlorophenol	1.80E+00	7.0E-09	6.6E-08	2.0E-13	n/a	7.3E-08	15%
488	1	Surface	Totals		2.1E-08	2.0E-07	2.8E-07	n/a	4.9E-07	
488	1		Percent		4.2E-02	4.0E-01	5.6E-01	n/a		

1 = Percentage of COPC to Total
SWMU = solid waste management unit
EU = exposure unit
COPC = chemical of potential concern
EPC = exposure point concentration
ELCR = excess lifetime cancer risk
n/a = not applicable

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ATTACHMENT D8

RISK SUMMARIES, EXCLUDING DERMAL ABSORPTION OF METALS

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Table D8.1. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.49E-05	Cesium-137 Neptunium-237 Thorium-230 Uranium-238	46.0 9.9 21.4 7.8	Ingestion Inhalation Dermal External Exposure	23.7 5.3 5.4 65.6	<1	*no COCs			
Outdoor Worker - surface	3.35E-05	Cesium-137 Neptunium-237 PCB, Total Plutonium-239/240 Thorium-230 Uranium-238	15.3 3.7 3.2 11.3 59.8 5.0	Ingestion Inhalation Dermal External Exposure	74.9 1.8 1.8 21.6	<1	*no COCs			
Outdoor Worker - subsurface	6.08E-05	Arsenic Cesium-137 Neptunium-237 Plutonium-239/240 Thorium-230 Trichloroethene Uranium-238	26.7 8.4 2.0 6.2 33.0 18.3 2.8	Ingestion Inhalation Dermal External Exposure	62.1 18.1 7.8 11.9	<1	Arsenic Cobalt	23.0 28.0	Ingestion Inhalation Dermal	83.3 6.4 10.2

Table D8.1. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.72E-05	Cesium-137	51.5	Ingestion	21.6	<1	*no COCs			
		Neptunium-237	11.1	Inhalation	1.9					
		PCB, Total	4.1	Dermal	3.1					
		Plutonium-239/240	3.3	External Exposure	73.3					
		Thorium-230	18.3							
		Uranium-235	2.0							
Uranium-238	8.5									
Future Child Resident - surface	6.72E-05	Cesium-137	51.5	Ingestion	21.6	<1	*no COCs			
		Neptunium-237	11.1	Inhalation	1.9					
		PCB, Total	4.1	Dermal	3.1					
		Plutonium-239/240	3.3	External Exposure	73.3					
		Thorium-230	18.3							
		Uranium-235	2.0							
Uranium-238	8.5									
Future Teen Recreational User - surface	3.14E-06	Cesium-137	45.8	Ingestion	12.7	<1	*no COCs			
				Inhalation	3.9					
				Dermal	18.0					
				External Exposure	65.3					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.2. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	9.96E-06	PCB, Total	96.2	Ingestion Inhalation Dermal External Exposure	6.3 10.6 83.1	<1	*no COCs			
Future Industrial Worker - surface	1.78E-04	Chromium PCB, Total	3.8 96.2	Ingestion Inhalation Dermal External Exposure	6.3 10.6 83.1	<1	*no COCs			
Outdoor Worker - surface	2.03E-04	Chromium PCB, Total	2.4 97.6	Ingestion Inhalation Dermal External Exposure	39.3 6.9 53.8	<1	*no COCs			
Outdoor Worker - subsurface	1.28E-03	Arsenic Chromium PCB, Total Trichloroethene Vinyl chloride	1.5 0.2 15.4 81.3 1.5	Ingestion Inhalation Dermal External Exposure	9.7 75.8 14.5	45.03	Arsenic cis-1,2-Dichloroeth Trichloroethene	0.3 91.5 7.4	Ingestion Inhalation Dermal	11.7 61.4 26.9

Table D8.2. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.60E-05	PCB, Total Trichloroethene	15.4 81.3	See Outdoor Worker (subsurface)	14.07	cis-1,2-Dichloroethene Trichloroethene	91.5 7.4	See Outdoor Worker (subsurface) for %		
Future Adult Resident - surface	5.16E-04	Chromium PCB, Total	2.5 97.5	Ingestion Inhalation Dermal External Exposure	<1	*no COCs				
Future Child Resident - surface	5.16E-04	Chromium PCB, Total	2.5 97.5	Ingestion Inhalation Dermal External Exposure	<1	Cadmium Mercury	17.1 32.8	Ingestion Inhalation Dermal	93.0 1.1 6.0	
Future Teen Recreational User - surface	1.09E-04	Chromium PCB, Total	1.1 98.9	Ingestion Inhalation Dermal External Exposure	<1	*no COCs				

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.3. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.65E-06	PCB, Total Uranium-238	43.6	Ingestion	7.1	<1	*no COCs			
			38.3	Inhalation	21.3					
Outdoor Worker - surface	3.17E-06	PCB, Total Uranium-238		Dermal	37.6	<1	*no COCs			
				External Exposure	33.9					
				Ingestion	42.5					
Outdoor Worker - subsurface	1.78E-05	Arsenic PCB, Total Uranium-238	42.2	Inhalation	13.2	<1	*no COCs			
			46.6	Dermal	23.3					
				External Exposure	21.0					
			84.5	Ingestion	72.7					
			7.2	Inhalation	0.4					
			8.3	Dermal	23.1					
				External Exposure	3.7					

Table D8.3. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.33E-06	PCB, Total Uranium-238	36.4 53.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	9.33E-06	PCB, Total Uranium-238	36.4 53.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	1.02E-06	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.4. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	5.39E-06	Chromium Cobalt-60	57.2 23.1	Ingestion Inhalation Dermal External Exposure	6.7 58.7 11.1 23.5	<1	*no COCs			
Outdoor Worker - surface	6.30E-06	Chromium Thorium-230	36.2 36.4	Ingestion Inhalation Dermal External Exposure	40.9 37.2 7.0 14.8	<1	*no COCs			
Outdoor Worker - subsurface	1.15E-05	Cesium-137 Chromium Thorium-230 Trichloroethene	25.4 15.1 19.9 26.6	Ingestion Inhalation Dermal External Exposure	22.5 39.9 4.3 33.2	<1	*no COCs			

Table D8.4. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.57E-05	Chromium	38.1	Ingestion	10.7	<1	*no COCs			
		Cobalt-60	40.0	Inhalation	39.0					
		PCB, Total	13.0	Dermal	9.8					
		Thorium-230	9.0	External Exposure	40.5					
Future Child Resident - surface	1.57E-05	Chromium	38.1	Ingestion	10.7	<1	*no COCs			
		Cobalt-60	40.0	Inhalation	39.0					
		PCB, Total	13.0	Dermal	9.8					
		Thorium-230	9.0	External Exposure	40.5					
Future Teen Recreational User - surface	1.30E-06	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.5. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.11E-06	PCB, Total Total PAH	46.2 53.4	Ingestion Inhalation Dermal External Exposure	7.1 3.8 89.1	<1	*no COCs			
Outdoor Worker - surface	3.70E-06	PCB, Total Total PAH	45.0 54.8	Ingestion Inhalation Dermal External Exposure	42.2 2.4 55.5	<1	*no COCs			
Outdoor Worker - subsurface	4.40E-05	Arsenic PCB, Total Total PAH	91.5 3.8 4.6	Ingestion Inhalation Dermal External Exposure	74.2 0.3 25.4	<1	Arsenic Cobalt	42.4 28.3	Ingestion Inhalation Dermal	82.7 7.0 10.3

Table D8.5. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 1, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.31E-06	PCB, Total Total PAH	45.4 54.3	Ingestion	21.1	<1	*no COCs			
				Inhalation	2.5					
				Dermal External Exposure	76.4					
Future Child Resident - surface	9.31E-06	PCB, Total Total PAH	45.4 54.3	Ingestion	21.1	<1	*no COCs			
				Inhalation	2.5					
				Dermal External Exposure	76.4					
Future Teen Recreational User - surface	2.00E-06	Total PAH	54.7	Ingestion	2.0	<1	*no COCs			
				Inhalation	1.1					
				Dermal External Exposure	96.9					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.6. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 99

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.06E-06	Chromium	59.6	Ingestion	2.0	<1	*no COCs			
				Inhalation	59.9					
				Dermal						
Outdoor Worker - surface	2.66E-06	Chromium	50.8	External Exposure	38.1	<1	Mercury	84.6	Ingestion Inhalation Dermal	99.5 0.5
				Ingestion	16.6					
				Inhalation	51.0					
Outdoor Worker - subsurface	2.68E-05	Arsenic Chromium	89.4 5.8	Dermal	32.4	<1	Arsenic Mercury	40.0 29.6	Ingestion Inhalation Dermal	87.3 3.7 9.1
				Ingestion	70.7					
				Inhalation	5.8					
				External Exposure	20.3					
					3.2					

Table D8.6. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 99 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.69E-06	Chromium Cobalt-60 Uranium-238	36.6 35.1 28.2	Ingestion	2.6	<1	*no COCs			
				Inhalation	36.8					
				Dermal						
Future Child Resident - surface	9.69E-06	Chromium Cobalt-60 Uranium-238	36.6 35.1 28.2	Ingestion	2.6	<1	Mercury	84.3	Ingestion	99.2
				Inhalation	36.8				Inhalation	0.8
				Dermal					Dermal	
Future Teen Recreational User - surface	<1E-6	*no COCs		External Exposure	60.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.7. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 99, Pipeline Borings

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface	1.12E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			

Table D8.7. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 99, Pipeline Borings (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

There are no surface data available for assessment.
 Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.8. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.29E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.58E-05	Arsenic Chromium	95.1 4.9	Ingestion Inhalation Dermal External Exposure	73.5 4.9 21.6	<1	Arsenic	47.1	Ingestion Inhalation Dermal	86.1 3.3 10.7

Table D8.8. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.50E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.50E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	<1	Mercury	71.0	Ingestion Inhalation Dermal	99.2 0.8
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.9. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.81E-06	Chromium	70.3	Ingestion	3.3	<1	*no COCs			
				Inhalation	70.4					
				Dermal						
Outdoor Worker - surface	2.67E-06	Chromium Uranium-238	54.7 45.3	External Exposure	26.3	<1	*no COCs			
				Ingestion	24.8					
				Inhalation	54.8					
Outdoor Worker - subsurface	2.71E-05	Arsenic Chromium Uranium-238	90.7 5.4 3.9	Dermal	20.5	<1	Arsenic	45.8	Ingestion Inhalation Dermal	86.0 3.6 10.4
				External Exposure	72.2					
				Ingestion	5.5					

Table D8.9. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	7.94E-06	Chromium Uranium-238	48.3 51.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	7.94E-06	Chromium Uranium-238	48.3 51.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.10. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.74E-05	Arsenic Chromium	84.4 7.4	Ingestion Inhalation Dermal External Exposure	22.8 7.6 65.7 3.8	<1	*no COCs			
Outdoor Worker - surface	3.81E-05	Arsenic Uranium-238	92.5 2.9	Ingestion Inhalation Dermal External Exposure	74.0 2.6 22.2 1.3	<1	Arsenic	92.5	Ingestion Inhalation Dermal	78.5 0.6 20.9
Outdoor Worker - subsurface	3.97E-05	Arsenic Cesium-137 Chromium	87.5 5.1 3.1	Ingestion Inhalation Dermal External Exposure	69.8 3.1 20.8 6.2	<1	Arsenic	92.8	Ingestion Inhalation Dermal	78.4 0.6 21.0

Table D8.10. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.04E-05	Arsenic	88.3	Ingestion	49.9	<1	Arsenic	96.0	Ingestion	38.8
		Chromium	3.6	Inhalation	3.7				Inhalation	0.9
		Total PAH	2.9	Dermal	41.6				Dermal	60.3
		Uranium-238	5.3	External Exposure	4.8					
Future Child Resident - surface	7.04E-05	Arsenic	88.3	Ingestion	49.9	<1	Arsenic	93.0	Ingestion	71.8
		Chromium	3.6	Inhalation	3.7				Inhalation	0.8
		Total PAH	2.9	Dermal	41.6				Dermal	27.4
		Uranium-238	5.3	External Exposure	4.8					
Future Teen Recreational User - surface	9.08E-06	Arsenic	90.9	Ingestion	7.9	<1	Arsenic	98.9	Ingestion	9.2
				Inhalation	2.7				Inhalation	0.7
				Dermal	87.9				Dermal	90.2
				External Exposure	1.5					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.11. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs					
Future Industrial Worker - surface	3.86E-06	Chromium Total PAH Uranium-238	41.6	Ingestion	5.4	<1	*no COCs					
			31.9	Inhalation	41.9							
			26.3	Dermal	29.5							
				External Exposure	23.3							
Outdoor Worker - surface	4.17E-06	Chromium Total PAH Uranium-238	28.5	Ingestion	35.2	<1	Mercury	83.2	Ingestion	99.5		
			36.1	Inhalation	28.7						Inhalation	0.5
			35.4	Dermal	20.2							
				External Exposure	16.0							
Outdoor Worker - subsurface	2.87E-05	Arsenic Cesium-137 Chromium	85.8	Ingestion	68.9	<1	Arsenic Mercury	34.6	Ingestion	89.8		
			4.3	Inhalation	4.8						Inhalation	2.4
			4.8	Dermal	20.6							
				External Exposure	5.7							

Table D8.11. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.19E-05	Chromium Total PAH Uranium-238	26.2 31.6 42.1	Ingestion Inhalation Dermal External Exposure	10.9 26.4 24.5 38.2	<1	*no COCs			
Future Child Resident - surface	1.19E-05	Chromium Total PAH Uranium-238	26.2 31.6 42.1	Ingestion Inhalation Dermal External Exposure	10.9 26.4 24.5 38.2	<1	Mercury	82.9	Ingestion Inhalation Dermal	99.2 0.8
Future Teen Recreational User - surface	1.31E-06	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.12. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.74E-06	Chromium	55.5	Ingestion	4.4	<1	*no COCs			
				Inhalation	55.9					
				Dermal	13.5					
				External Exposure	26.2					
Outdoor Worker - surface	2.79E-06	Chromium Uranium-238	40.2	Ingestion	30.7	<1	Mercury	81.7	Ingestion Inhalation Dermal	99.4 0.6
				Inhalation	40.5					
				Dermal	9.8					
				External Exposure	19.0					
Outdoor Worker - subsurface	3.50E-05	Arsenic Chromium Total PAH	66.9	Ingestion	64.8	<1	Arsenic Mercury	38.0 26.2	Ingestion Inhalation Dermal	84.8 6.6 8.6
				Inhalation	4.0					
				Dermal	30.0					
				External Exposure	1.2					

Table D8.12. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.17E-06	Chromium Total PAH Uranium-238	36.1 14.9 48.8	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	8.17E-06	Chromium Total PAH Uranium-238	36.1 14.9 48.8	Ingestion Inhalation Dermal External Exposure	<1	Mercury	81.4	Ingestion Inhalation Dermal	99.1 0.9
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.13. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 6

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.01E-06	Chromium	61.0	Ingestion	4.3	<1	*no COCs			
				Inhalation	61.5					
				Dermal External Exposure	34.2					
Outdoor Worker - surface	2.04E-06	Uranium-238	55.2	Ingestion	30.2	<1	*no COCs			
				Inhalation	44.9					
				Dermal External Exposure	24.9					
Outdoor Worker - subsurface	<1E-6					<1	*no COCs			

Table D8.13. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.21E-06	Chromium Uranium-238	38.3	Ingestion	5.6	<1	*no COCs			
			61.4	Inhalation Dermal External Exposure	38.6 55.8					
Future Child Resident - surface	6.21E-06	Chromium Uranium-238	38.3	Ingestion	5.6	<1	Manganese		Ingestion Inhalation Dermal	61.9 38.1
			61.4	Inhalation Dermal External Exposure	38.6 55.8					
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.14. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 7

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.77E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.31E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.59E-05	Arsenic Chromium	94.9 5.0	Ingestion Inhalation Dermal External Exposure	73.3 5.1 21.5	<1	Arsenic	73.5	Ingestion Inhalation Dermal	76.6 6.7 16.6

Table D8.14. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 7 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.44E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.44E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.15. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 8

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.12E-05	Chromium Total PAH	15.9	Ingestion	6.7	<1	*no COCs			
			73.4	Inhalation Dermal External Exposure	16.0 70.8 6.5					
Outdoor Worker - surface	1.30E-05	Chromium Total PAH Uranium-238	10.1	Ingestion	40.8	<1	*no COCs			
			76.8 9.1	Inhalation Dermal External Exposure	10.2 44.9 4.1					
Outdoor Worker - subsurface	3.94E-05	Arsenic Cesium-137 Chromium Total PAH Uranium-238	66.5	Ingestion	62.1	<1	Arsenic Cobalt	41.4 39.4	Ingestion Inhalation Dermal	83.7 6.2 10.0
			6.1 3.8 19.6 2.6	Inhalation Dermal External Exposure	4.0 26.7 7.2					

Table D8.15. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 8 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.36E-05	Bis(2-ethylhexyl)p Chromium Total PAH Uranium-238	3.6 10.2 74.2 11.9	Ingestion Inhalation Dermal External Exposure	18.6 10.3 60.3 10.8	<1	*no COCs			
Future Child Resident - surface	3.36E-05	Bis(2-ethylhexyl)p Chromium Total PAH Uranium-238	3.6 10.2 74.2 11.9	Ingestion Inhalation Dermal External Exposure	18.6 10.3 60.3 10.8	<1	Manganese	86.5	Ingestion Inhalation Dermal	47.9 44.3 7.7
Future Teen Recreational User - surface	6.13E-06	Total PAH	88.0	Ingestion Inhalation Dermal External Exposure	2.1 5.3 90.1 2.5	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.16. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 9

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.32E-05	Arsenic Chromium	87.0	Ingestion	22.7	<1	*no COCs			
			13.0	Inhalation Dermal External Exposure	13.2 64.1					
Outdoor Worker - surface	2.88E-05	Arsenic Chromium	95.6	Ingestion	73.9	<1	Arsenic	99.9	Ingestion Inhalation Dermal	77.0 0.4 22.6
			4.4	Inhalation Dermal External Exposure	4.4 21.7					
Outdoor Worker - subsurface	2.47E-05	Arsenic Chromium	95.5	Ingestion	73.8	<1	Arsenic	78.1	Ingestion Inhalation Dermal	77.0 5.4 17.7
			4.5	Inhalation Dermal External Exposure	4.5 21.7					

Table D8.16. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 9 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.18E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.8	<1	Arsenic	100.0	Ingestion	36.7
				Inhalation	6.5				Inhalation	0.6
				Dermal External Exposure	41.8				Dermal	62.7
Future Child Resident - surface	5.18E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.8	<1	Arsenic	99.9	Ingestion	70.1
				Inhalation	6.5				Inhalation	0.5
				Dermal External Exposure	41.8				Dermal	29.4
Future Teen Recreational User - surface	6.76E-06	Arsenic	95.4	Ingestion	8.1	<1	*no COCs			
				Inhalation	4.7					
				Dermal External Exposure	87.2					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.17. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 10

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.42E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.54E-05	Arsenic	48.1	Ingestion	14.3	<1	*no COCs			
		Cesium-137	26.6	Inhalation	4.9					
		Chromium	4.7	Dermal	51.2					
		Total PAH	17.1	External Exposure	29.6					
Outdoor Worker - surface	4.18E-05	Arsenic	70.1	Ingestion	61.5	<1	Arsenic	92.9	Ingestion Inhalation Dermal	78.3 0.7 21.0
		Cesium-137	12.1	Inhalation	2.2					
		Total PAH	12.7	Dermal	23.0					
		Uranium-238	3.0	External Exposure	13.3					
Outdoor Worker - subsurface	3.94E-05	Arsenic	67.4	Ingestion	59.9	<1	Arsenic	56.6	Ingestion Inhalation Dermal	86.8 0.4 12.8
		Cesium-137	12.8	Inhalation	3.2					
		Chromium	3.1	Dermal	22.8					
		Total PAH	13.5	External Exposure	14.1					
Uranium-238	3.2									

Table D8.17. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 10 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.06E-04	Arsenic	48.9	Ingestion	30.3	<1	Arsenic	96.1	Ingestion	38.6
		Cesium-137	32.2	Inhalation	2.3				Inhalation	1.1
		Chromium	2.2	Dermal	31.6				Dermal	60.3
		Total PAH	12.5	External Exposure	35.9					
		Uranium-238	4.1							
Future Child Resident - surface	1.06E-04	Arsenic	48.9	Ingestion	30.3	<1	Arsenic	93.3	Ingestion	71.5
		Cesium-137	32.2	Inhalation	2.3				Inhalation	1.0
		Chromium	2.2	Dermal	31.6				Dermal	27.5
		Total PAH	12.5	External Exposure	35.9					
		Uranium-238	4.1							
Future Teen Recreational User - surface	1.15E-05	Arsenic	59.5	Ingestion	5.7	<1	*no COCs			
		Cesium-137	12.3	Inhalation	2.0					
		Total PAH	24.8	Dermal	78.7					
				External Exposure	13.7					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.18. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 11

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.88E-06	Chromium Total PAH	37.6 46.6	Ingestion Inhalation Dermal External Exposure	4.5 39.1 56.4	<1	*no COCs			
Outdoor Worker - surface	2.97E-06	Total PAH	55.3	Ingestion Inhalation Dermal External Exposure	31.3 28.1 40.6	<1	*no COCs			
Outdoor Worker - subsurface	2.95E-05	Arsenic Chromium Total PAH	88.0 4.7 5.6	Ingestion Inhalation Dermal External Exposure	71.1 4.9 24.0	<1	Arsenic	54.1	Ingestion Inhalation Dermal	87.3 0.5 12.2

Table D8.18. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 11 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.53E-06	Chromium PCB, Total Total PAH	27.9 17.5 54.3	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	7.53E-06	Chromium PCB, Total Total PAH	27.9 17.5 54.3	Ingestion Inhalation Dermal External Exposure	<1	Mercury	76.8	Ingestion Inhalation Dermal	98.8 1.2
Future Teen Recreational User - surface	1.36E-06	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.19. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 12

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.72E-05	Chromium Total PAH	12.2 87.7	Ingestion Inhalation Dermal External Exposure	6.6 12.4 81.0	<1	*no COCs			
Outdoor Worker - surface	1.99E-05	Chromium Total PAH	7.8 92.2	Ingestion Inhalation Dermal External Exposure	40.5 7.9 51.6	<1	*no COCs			
Outdoor Worker - subsurface	3.83E-05	Arsenic Chromium Total PAH	57.8 4.1 38.1	Ingestion Inhalation Dermal External Exposure	61.4 4.1 34.4	<1	Arsenic	71.4	Ingestion Inhalation Dermal	77.0 6.8 16.2

Table D8.19. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 12 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.99E-05	Chromium Total PAH	8.2 91.8	Ingestion Inhalation Dermal External Exposure	20.4 8.3 71.3	<1	*no COCs			
Future Child Resident - surface	4.99E-05	Chromium Total PAH	8.2 91.8	Ingestion Inhalation Dermal External Exposure	20.4 8.3 71.3	<1	*no COCs			
Future Teen Recreational User - surface	1.03E-05	Total PAH	96.3	Ingestion Inhalation Dermal External Exposure	2.0 3.8 94.2	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.20. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 13

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	3.13E-06	Chromium Total PAH	50.5	Ingestion	3.7	<1	*no COCs			
			49.3	Inhalation	50.8					
				Dermal External Exposure	45.5					
Outdoor Worker - surface	3.06E-06	Chromium Total PAH	38.2	Ingestion	27.1	<1	*no COCs			
			61.6	Inhalation	38.4					
				Dermal External Exposure	34.5					
Outdoor Worker - subsurface	2.68E-05	Arsenic Chromium Total PAH	89.1	Ingestion	71.1	<1	Arsenic	79.9	Ingestion Inhalation Dermal	76.0
			5.7	Inhalation	5.8					5.9
			5.2	Dermal External Exposure	23.1					18.1

Table D8.20. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 13 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.78E-06	Chromium Total PAH	39.4 60.4	Ingestion	13.4	<1	*no COCs			
				Inhalation	39.6					
				Dermal External Exposure	46.9					
Future Child Resident - surface	7.78E-06	Chromium Total PAH	39.4 60.4	Ingestion	13.4	<1	*no COCs			
				Inhalation	39.6					
				Dermal External Exposure	46.9					
Future Teen Recreational User - surface	1.30E-06	Total PAH	77.8	Ingestion	1.6	<1	*no COCs			
				Inhalation	22.2					
				Dermal External Exposure	76.2					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.21. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 14

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.73E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.28E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.76E-05	Arsenic Chromium	94.6 5.4	Ingestion Inhalation Dermal External Exposure	73.1 5.5 21.5	<1	Arsenic Mercury	43.0 27.3	Ingestion Inhalation Dermal	86.4 3.9 9.7

Table D8.21. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 14 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.35E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.35E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	Mercury	99.9	Ingestion Inhalation Dermal	100.0
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.22. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 15

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.77E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.31E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.31E-05	Arsenic Chromium	93.5 6.4	Ingestion Inhalation Dermal External Exposure	72.3 6.5 21.2	<1	Arsenic	73.7	Ingestion Inhalation Dermal	77.2 6.1 16.7

Table D8.22. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 15 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.43E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.43E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.23. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 16

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.33E-05	Arsenic Chromium	86.7	Ingestion	22.7	<1	*no COCs			
			13.2	Inhalation	13.4					
				Dermal External Exposure	63.9					
Outdoor Worker - surface	2.91E-05	Arsenic Chromium	95.5	Ingestion	73.8	<1	Arsenic	69.2	Ingestion Inhalation Dermal	83.8 0.5 15.7
			4.5	Inhalation	4.6					
				Dermal External Exposure	21.7					
Outdoor Worker - subsurface	2.77E-05	Arsenic Chromium	95.3	Ingestion	73.6	<1	Arsenic	54.0	Ingestion Inhalation Dermal	78.1 9.7 12.2
			4.7	Inhalation	4.8					
				Dermal External Exposure	21.6					

Table D8.23. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 16 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.24E-05	Arsenic Chromium	93.4 6.5	Ingestion	51.7	<1	Arsenic	82.2	Ingestion	47.5
				Inhalation	6.6				Inhalation	1.0
				Dermal External Exposure	41.7				Dermal	51.6
Future Child Resident - surface	5.24E-05	Arsenic Chromium	93.4 6.5	Ingestion	51.7	<1	Arsenic Thallium Vanadium	71.1 10.2 10.7	Ingestion	78.3
				Inhalation	6.6				Inhalation	0.8
				Dermal External Exposure	41.7				Dermal	20.9
Future Teen Recreational User - surface	6.82E-06	Arsenic	95.3	Ingestion	8.1	<1	*no COCs			
				Inhalation	4.8					
				Dermal External Exposure	87.1					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.24. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 17

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.58E-05	Arsenic Chromium Total PAH	73.3 9.7 17.0	Ingestion Inhalation Dermal External Exposure	20.4 9.9 69.7	<1	*no COCs			
Outdoor Worker - surface	3.22E-05	Arsenic Chromium Total PAH	86.3 3.5 10.1	Ingestion Inhalation Dermal External Exposure	71.1 3.6 25.3	<1	Arsenic	96.9	Ingestion Inhalation Dermal	76.8 0.4 22.8
Outdoor Worker - subsurface	3.26E-05	Arsenic Cesium-137 Chromium Total PAH	82.5 6.7 4.1 6.6	Ingestion Inhalation Dermal External Exposure	66.7 4.2 22.4 6.7	<1	Arsenic	90.8	Ingestion Inhalation Dermal	78.1 0.7 21.2

Table D8.24. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 17 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.02E-05	Arsenic	81.5	Ingestion	48.1	<1	Arsenic	96.6	Ingestion	36.5
		Chromium	5.0	Inhalation	5.0				Inhalation	0.6
		Total PAH	13.6	Dermal External Exposure	46.9				Dermal	62.9
Future Child Resident - surface	6.02E-05	Arsenic	81.5	Ingestion	48.1	<1	Arsenic	96.8	Ingestion	69.8
		Chromium	5.0	Inhalation	5.0				Inhalation	0.6
		Total PAH	13.6	Dermal External Exposure	46.9				Dermal	29.6
Future Teen Recreational User - surface	8.56E-06	Arsenic	76.1	Ingestion	6.9	<1	*no COCs			
		Total PAH	20.6	Inhalation	3.3					
				Dermal External Exposure	89.8					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.25. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 18

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.29E-05	Arsenic Chromium	82.3 17.6	Ingestion Inhalation Dermal External Exposure	21.5 17.8 60.7	<1	*no COCs			
Outdoor Worker - surface	2.72E-05	Arsenic Chromium	93.8 6.2	Ingestion Inhalation Dermal External Exposure	72.5 6.3 21.3	<1	Arsenic	93.0	Ingestion Inhalation Dermal	78.3 0.7 21.0
Outdoor Worker - subsurface	3.03E-05	Arsenic Chromium	94.4 5.5	Ingestion Inhalation Dermal External Exposure	73.0 5.6 21.4	<1	Arsenic Iron	40.5 23.7	Ingestion Inhalation Dermal	87.0 3.8 9.2

Table D8.25. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 18 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.93E-05	Arsenic Chromium	91.0 8.9	Ingestion Inhalation Dermal External Exposure	50.3 9.0 40.6	<1	Arsenic	96.2	Ingestion Inhalation Dermal	38.6 1.0 60.4
Future Child Resident - surface	4.93E-05	Arsenic Chromium	91.0 8.9	Ingestion Inhalation Dermal External Exposure	50.3 9.0 40.6	<1	Arsenic	93.4	Ingestion Inhalation Dermal	71.6 1.0 27.5
Future Teen Recreational User - surface	6.38E-06	Arsenic	93.5	Ingestion Inhalation Dermal External Exposure	7.9 6.6 85.5	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.26. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 19

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.23E-05	Arsenic Chromium	87.0 13.0	Ingestion Inhalation Dermal External Exposure	22.7 13.2 64.1	<1	*no COCs			
Outdoor Worker - surface	2.70E-05	Arsenic Chromium	95.6 4.4	Ingestion Inhalation Dermal External Exposure	73.8 4.5 21.7	<1	Arsenic	93.7	Ingestion Inhalation Dermal	78.2 0.6 21.2
Outdoor Worker - subsurface	2.52E-05	Arsenic Chromium	95.3 4.7	Ingestion Inhalation Dermal External Exposure	73.6 4.8 21.6	<1	Arsenic	88.7	Ingestion Inhalation Dermal	79.3 0.7 20.1

Table D8.26. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 19 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.85E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.7	<1	Arsenic	96.6	Ingestion	38.4
				Inhalation	6.5				Inhalation	1.0
				Dermal External Exposure	41.8				Dermal	60.6
Future Child Resident - surface	4.85E-05	Arsenic Chromium	93.6 6.4	Ingestion	51.7	<1	Arsenic	94.1	Ingestion	71.4
				Inhalation	6.5				Inhalation	0.9
				Dermal External Exposure	41.8				Dermal	27.7
Future Teen Recreational User - surface	6.32E-06	Arsenic	95.4	Ingestion Inhalation Dermal External Exposure	8.1 4.7 87.2	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.27. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 20

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI			
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs						
Future Industrial Worker - surface	1.42E-05	Arsenic Chromium	83.5	Ingestion	22.1	<1	*no COCs						
			12.2	Inhalation	12.9								
				Dermal External Exposure	65.0								
Outdoor Worker - surface	3.05E-05	Arsenic Chromium	93.5	Ingestion	73.2	<1	Arsenic Cobalt	27.0	Ingestion	87.5			
			4.2	Inhalation	4.5						37.5	Inhalation	6.4
				Dermal External Exposure	22.4								
Outdoor Worker - subsurface	2.98E-05	Arsenic Chromium	92.6	Ingestion	72.1	<1	Arsenic Cobalt	29.9	Ingestion	86.0			
			5.9	Inhalation	6.1						30.3	Inhalation	7.3
				Dermal External Exposure	21.8								

Table D8.27. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 20 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.54E-05	Arsenic Chromium Total PAH	90.8 6.1 2.9	Ingestion Inhalation Dermal External Exposure	50.8 6.4 42.7	<1	Arsenic	39.5	Ingestion Inhalation Dermal	61.0 14.3 24.8
Future Child Resident - surface	5.54E-05	Arsenic Chromium Total PAH	90.8 6.1 2.9	Ingestion Inhalation Dermal External Exposure	50.8 6.4 42.7	2.58	Arsenic Cobalt Manganese Mercury	27.9 35.5 16.6 12.0	Ingestion Inhalation Dermal	82.2 9.6 8.2
Future Teen Recreational User - surface	7.36E-06	Arsenic	90.8	Ingestion Inhalation Dermal External Exposure	7.8 4.6 87.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.28. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 21

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.83E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.36E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	8.64E-05	Arsenic Chromium	98.2 1.6	Ingestion Inhalation Dermal External Exposure	75.8 1.9 22.3	3.30	Arsenic Cobalt Iron Manganese	16.1 29.5 7.1 38.8	Ingestion Inhalation Dermal	80.4 16.0 3.6

Table D8.28. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 21 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.08E-06	Arsenic	98.2	See Outdoor Worker (subsurface)	1.03	1.03	Arsenic Cobalt Manganese	16.1 29.5 38.8	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.56E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	<1	*no COCs			
Future Child Resident - surface	3.56E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	<1	Mercury Thallium	60.9 22.1	Ingestion Inhalation Dermal	99.2 0.8
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.29. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 22

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.35E-06	PCB, Total	97.3	Ingestion Inhalation Dermal External Exposure	6.4 9.7 84.0	<1	*no COCs			
Future Industrial Worker - surface	5.98E-05	Chromium PCB, Total	2.7 97.3	Ingestion Inhalation Dermal External Exposure	6.4 9.7 84.0	<1	*no COCs			
Outdoor Worker - surface	6.85E-05	Chromium PCB, Total	1.8 98.2	Ingestion Inhalation Dermal External Exposure	39.6 6.2 54.2	<1	*no COCs			
Outdoor Worker - subsurface	9.45E-05	Arsenic Cesium-137 Chromium PCB, Total	29.3 1.5 1.2 67.9	Ingestion Inhalation Dermal External Exposure	50.0 4.4 44.1 1.5	<1	Arsenic Cobalt	42.2 30.8	Ingestion Inhalation Dermal	85.1 5.3 9.6

Table D8.29. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 22 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.18E-06			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.74E-04	Chromium PCB, Total	1.8 98.2	Ingestion Inhalation Dermal External Exposure	19.6 6.5 73.9	<1	*no COCs			
Future Child Resident - surface	1.74E-04	Chromium PCB, Total	1.8 98.2	Ingestion Inhalation Dermal External Exposure	19.6 6.5 73.9	<1	Manganese	99.7	Ingestion Inhalation Dermal	48.9 51.1
Future Teen Recreational User - surface	3.68E-05	PCB, Total	99.2	Ingestion Inhalation Dermal External Exposure	1.9 2.9 95.2	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.30. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 23

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.38E-05	Arsenic Chromium	84.1 15.9	Ingestion Inhalation Dermal External Exposure	22.0 16.1 62.0	<1	*no COCs			
Outdoor Worker - surface	2.95E-05	Arsenic Chromium	94.5 5.5	Ingestion Inhalation Dermal External Exposure	73.0 5.6 21.4	<1	Arsenic	60.2	Ingestion Inhalation Dermal	85.9 0.5 13.6
Outdoor Worker - subsurface	3.10E-05	Arsenic Cesium-137 Chromium	87.4 7.9 4.7	Ingestion Inhalation Dermal External Exposure	67.6 4.7 19.8 7.8	<1	Arsenic	38.6	Ingestion Inhalation Dermal	86.1 3.1 10.8

Table D8.30. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 23 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.33E-05	Arsenic Chromium	92.0 8.0	Ingestion Inhalation Dermal External Exposure	50.9 8.1 41.1	<1	Arsenic	75.8	Ingestion Inhalation Dermal	51.5 0.9 47.5
Future Child Resident - surface	5.33E-05	Arsenic Chromium	92.0 8.0	Ingestion Inhalation Dermal External Exposure	50.9 8.1 41.1	1.13	Arsenic Iron	62.3 29.6	Ingestion Inhalation Dermal	80.9 0.7 18.3
Future Teen Recreational User - surface	6.92E-06	Arsenic	94.2	Ingestion Inhalation Dermal External Exposure	8.0 5.8 86.2	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.31. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 24

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.06E-06	Chromium	80.9	Ingestion	1.4	<1	*no COCs			
				Inhalation	81.3					
				Dermal External Exposure	17.3					
Outdoor Worker - surface	1.71E-06	Chromium	72.1	Ingestion	12.1	<1	*no COCs			
				Inhalation	72.5					
				Dermal External Exposure	15.4					
Outdoor Worker - subsurface	3.20E-05	Arsenic Cesium-137 Chromium	89.7 5.8 3.6	Ingestion	69.8	<1	Arsenic Iron	43.0 27.5	Ingestion Inhalation Dermal	87.6 2.7 9.7
				Inhalation	3.6					
				Dermal	20.9					
				External Exposure	5.7					

Table D8.31. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 24 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	4.42E-06	Chromium Total PAH	73.1 26.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	4.42E-06	Chromium Total PAH	73.1 26.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.32. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 25

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.38E-06	Chromium	85.1	Ingestion Inhalation Dermal External Exposure	1.1 85.4 13.5	<1	*no COCs			
Outdoor Worker - surface	1.93E-06	Chromium	77.8	Ingestion Inhalation Dermal External Exposure	9.7 78.0 12.3	<1	*no COCs			
Outdoor Worker - subsurface	2.70E-05	Arsenic Chromium	93.7 4.7	Ingestion Inhalation Dermal External Exposure	73.1 4.8 22.1	<1	Arsenic	58.5	Ingestion Inhalation Dermal	79.3 7.5 13.2

Table D8.32. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 25 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.01E-06	Chromium Total PAH	78.6 21.1	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	5.01E-06	Chromium Total PAH	78.6 21.1	Ingestion Inhalation Dermal External Exposure	<1	Manganese	73.7	Ingestion Inhalation Dermal	59.7 40.3
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.33. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 26

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.39E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.03E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.31E-05	Arsenic Chromium	94.7 5.1	Ingestion Inhalation Dermal External Exposure	73.2 5.3 21.5	<1	Arsenic Cobalt	33.1 38.2	Ingestion Inhalation Dermal	89.0 3.5 7.5

Table D8.33. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 26 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.69E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.69E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.34. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 27

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.74E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.28E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.69E-05	Arsenic Chromium	95.3 4.7	Ingestion Inhalation Dermal External Exposure	73.6 4.8 21.6	<1	Arsenic	87.2	Ingestion Inhalation Dermal	79.6 0.6 19.7

Table D8.34. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 27 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.37E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.37E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.35. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 28

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.41E-05	Arsenic Chromium	85.7 14.3	Ingestion Inhalation Dermal External Exposure	22.4 14.5 63.1	<1	*no COCs			
Outdoor Worker - surface	3.05E-05	Arsenic Chromium	95.1 4.9	Ingestion Inhalation Dermal External Exposure	73.5 5.0 21.6	<1	Arsenic	65.2	Ingestion Inhalation Dermal	78.1 7.2 14.7
Outdoor Worker - subsurface	2.88E-05	Arsenic Chromium	94.6 5.4	Ingestion Inhalation Dermal External Exposure	73.0 5.5 21.5	<1	Arsenic	62.7	Ingestion Inhalation Dermal	78.1 7.7 14.2

Table D8.35. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 28 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.50E-05	Arsenic Chromium	92.9 7.1	Ingestion	51.4	<1	Arsenic	73.2	Ingestion	41.8
				Inhalation	7.2				Inhalation	12.3
				Dermal External Exposure	41.4				Dermal	45.9
Future Child Resident - surface	5.50E-05	Arsenic Chromium	92.9 7.1	Ingestion	51.4	1.13	Arsenic Manganese Vanadium	64.8 18.9 9.2	Ingestion	70.6
				Inhalation	7.2				Inhalation	10.4
				Dermal External Exposure	41.4				Dermal	19.1
Future Teen Recreational User - surface	7.16E-06	Arsenic	94.9	Ingestion Inhalation Dermal External Exposure	8.0 5.2 86.8	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.36. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 29

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.68E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.24E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	3.59E-05	Arsenic Chromium	95.9 3.9	Ingestion Inhalation Dermal External Exposure	74.1 4.1 21.8	<1	Arsenic Cobalt Manganese	34.7 26.7 17.6	Ingestion Inhalation Dermal	84.2 8.0 7.9

Table D8.36. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 29 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.26E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.26E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.37. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 30

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.88E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.39E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	Mercury	83.8	Ingestion Inhalation Dermal	99.5 0.5
Outdoor Worker - subsurface	2.42E-05	Arsenic Chromium	94.2 5.8	Ingestion Inhalation Dermal External Exposure	72.8 5.9 21.4	<1	Arsenic Mercury	45.2 32.4	Ingestion Inhalation Dermal	86.2 3.6 10.2

Table D8.37. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 30 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.65E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.65E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	Mercury	83.5	Ingestion Inhalation Dermal	99.2 0.8
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.38. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 31

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	7.63E-06	Cesium-137 Uranium-238	86.7	Ingestion	1.6	<1	*no COCs			
			13.3	Inhalation Dermal External Exposure	0.0 98.4					
Outdoor Worker - surface	6.41E-06	Cesium-137 Uranium-238	77.1	Ingestion	13.4	<1	*no COCs			
			22.9	Inhalation Dermal External Exposure	0.0 86.6					
Outdoor Worker - subsurface	6.41E-06	Cesium-137 Uranium-238	77.1	Ingestion	13.4	<1	*no COCs			
			22.9	Inhalation Dermal External Exposure	0.0 86.6					

Table D8.38. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 194, EU 31 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.83E-05	Cesium-137 Uranium-238	87.0 13.0	Ingestion Inhalation Dermal External Exposure	1.3 0.0 98.7	<1	*no COCs			
Future Child Resident - surface	3.83E-05	Cesium-137 Uranium-238	87.0 13.0	Ingestion Inhalation Dermal External Exposure	1.3 0.0 98.7	<1	*no COCs			
Future Teen Recreational User - surface	1.59E-06	Cesium-137	87.4	Ingestion Inhalation Dermal External Exposure	0.8 0.0 99.1	<1	*no COCs			

There are no subsurface data available for assessment.
 Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.39. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 196, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs			<1		*no COCs			
Future Industrial Worker - surface	2.76E-06	Neptunium-237	41.6	Ingestion Inhalation Dermal External Exposure	4.2 25.8 70.0	<1	*no COCs			
Outdoor Worker - surface	2.79E-06	Uranium-238	47.2	Ingestion Inhalation Dermal External Exposure	29.8 18.9 51.3	<1	Nickel	75.9	Ingestion Inhalation Dermal	96.2 3.8
Outdoor Worker - subsurface	3.08E-05	Arsenic Chromium Uranium-238	82.2 8.9 4.3	Ingestion Inhalation Dermal External Exposure	66.2 10.5 18.6 4.6	8.78	Antimony Arsenic Beryllium Cadmium Cobalt Iron Nickel Thallium	12.0 1.8 2.3 6.5 15.0 1.7 1.2 56.4	Ingestion Inhalation Dermal	97.0 0.8 2.2

Table D8.39. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 196, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		2.74	Antimony Cadmium Cobalt Thallium	12.0 6.5 15.0 56.4	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.16E-05	Chromium Neptunium-237 Uranium-238	10.9 49.7 38.4	Ingestion Inhalation Dermal External Exposure	4.1 11.9 84.1	<1	*no COCs			
Future Child Resident - surface	1.16E-05	Chromium Neptunium-237 Uranium-238	10.9 49.7 38.4	Ingestion Inhalation Dermal External Exposure	4.1 11.9 84.1	<1	Nickel	76.4	Ingestion Inhalation Dermal	94.0 6.0
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.40. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 196, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.21E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.15E-05	PCB, Total Total PAH Uranium-238	37.4 53.4 6.0	Ingestion Inhalation Dermal External Exposure	7.2 6.0 81.5 5.3	<1	*no COCs			
Outdoor Worker - surface	2.57E-05	PCB, Total Total PAH Uranium-238	36.2 54.5 7.3	Ingestion Inhalation Dermal External Exposure	42.5 3.7 50.5 3.3	<1	*no COCs			
Outdoor Worker - subsurface	2.20E-04	Arsenic PCB, Total Total PAH Uranium-238	10.3 4.2 84.6 0.9	Ingestion Inhalation Dermal External Exposure	47.3 0.3 52.0 0.4	<1	Antimony Arsenic	65.3 17.1	Ingestion Inhalation Dermal	94.8 0.6 4.6

Table D8.40. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 196, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.75E-06	Total PAH	84.6	See Outdoor Worker (subsurface)	<1	<1	Antimony	65.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.64E-05	Chromium	2.0	Ingestion	19.7	<1	*no COCs			
		PCB, Total	35.6	Inhalation	3.8					
		Total PAH	52.7	Dermal	67.8					
		Uranium-238	9.6	External Exposure	8.7					
Future Child Resident - surface	6.64E-05	Chromium	2.0	Ingestion	19.7	<1	*no COCs			
		PCB, Total	35.6	Inhalation	3.8					
		Total PAH	52.7	Dermal	67.8					
		Uranium-238	9.6	External Exposure	8.7					
Future Teen Recreational User - surface	1.30E-05	PCB, Total	38.9	Ingestion	2.1	<1	*no COCs			
		Total PAH	58.2	Inhalation	1.8					
				Dermal	94.2					
				External Exposure	1.9					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.41. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 489

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	3.64E-06	Chromium Total PAH	37.9	Ingestion	5.5	<1	*no COCs				
			38.1	Inhalation	38.3						
				Dermal	35.2						
				External Exposure	21.0						
Outdoor Worker - surface	3.97E-06	Chromium Total PAH Uranium-238	25.7	Ingestion	36.0	<1	*no COCs				
			42.6	Inhalation	25.9						
			31.5	Dermal	23.8						
				External Exposure	14.2						
Outdoor Worker - subsurface	2.71E-05	Arsenic Total PAH Uranium-238	89.1	Ingestion	74.1	<1	Arsenic	88.9	Ingestion Inhalation Dermal	78.4 0.8 20.8	
			6.3	Inhalation	0.1						
			4.6	Dermal	23.7						
				External Exposure	2.1						

Table D8.41. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 489 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.12E-05	Chromium Total PAH Uranium-238	24.0 37.9 38.0	Ingestion Inhalation Dermal External Exposure	11.9 24.2 29.4 34.5	<1	*no COCs			
Future Child Resident - surface	1.12E-05	Chromium Total PAH Uranium-238	24.0 37.9 38.0	Ingestion Inhalation Dermal External Exposure	11.9 24.2 29.4 34.5	<1	*no COCs			
Future Teen Recreational User - surface	1.34E-06	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.42. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 531

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.91E-06	Arsenic	90.4	Ingestion Inhalation Dermal External Exposure	24.2 3.4 68.2 4.1	<1	*no COCs			
Future Industrial Worker - surface	5.19E-05	Arsenic Chromium Uranium-238	90.4 3.2 3.9	Ingestion Inhalation Dermal External Exposure	24.2 3.4 68.2 4.1	<1	Arsenic	82.5	Ingestion Inhalation Dermal	36.6 1.6 61.8
Outdoor Worker - surface	1.18E-04	Arsenic Chromium Total PAH Uranium-238	95.3 1.0 0.9 2.5	Ingestion Inhalation Dermal External Exposure	75.4 1.1 22.1 1.3	1.10	Arsenic Iron	64.2 25.7	Ingestion Inhalation Dermal	84.7 0.4 14.9
Outdoor Worker - subsurface	1.19E-04	Arsenic Chromium Total PAH Uranium-238	95.2 1.1 0.9 2.5	Ingestion Inhalation Dermal External Exposure	75.4 1.2 22.1 1.3	1.13	Arsenic Iron	62.2 24.9	Ingestion Inhalation Dermal	83.9 1.6 14.4

Table D8.42. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 531 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.48E-06	Arsenic	95.2	See Outdoor Worker (subsurface)	<1	<1	Arsenic	62.2	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.17E-04	Arsenic	91.8	Ingestion	51.5	<1	Arsenic	78.0	Ingestion	49.0
		Chromium	1.5	Inhalation	1.6		Iron	14.9	Inhalation	0.7
		Total PAH	1.3	Dermal	41.9				Dermal	50.3
		Uranium-235	0.8	External Exposure	5.0					
		Uranium-238	4.6							
Future Child Resident - surface	2.17E-04	Arsenic	91.8	Ingestion	51.5	4.30	Arsenic	66.2	Ingestion	79.4
		Chromium	1.5	Inhalation	1.6		Iron	24.1	Inhalation	0.6
		Total PAH	1.3	Dermal	41.9		Nickel	2.6	Dermal	20.0
		Uranium-235	0.8	External Exposure	5.0		Uranium	2.4		
		Uranium-238	4.6				Zinc	2.4		
Future Teen Recreational User - surface	2.78E-05	Arsenic	95.0	Ingestion	8.2	<1	Arsenic	92.0	Ingestion	13.3
				Inhalation	1.2				Inhalation	0.6
				Dermal	89.0				Dermal	86.1
				External Exposure	1.6					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.43. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 200

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.42E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.54E-05	Cesium-137 Chromium PCB, Total Uranium-238	26.3 7.5 54.6 8.3	Ingestion Inhalation Dermal External Exposure	4.7 11.5 48.8 35.0	<1	*no COCs			
Outdoor Worker - surface	2.64E-05	Cesium-137 Chromium PCB, Total Uranium-238	18.9 5.3 60.8 11.6	Ingestion Inhalation Dermal External Exposure	32.2 8.2 34.8 24.9	<1	*no COCs			
Outdoor Worker - subsurface	4.81E-05	Arsenic Cesium-137 Chromium PCB, Total Uranium-238	48.8 8.4 3.2 33.3 5.0	Ingestion Inhalation Dermal External Exposure	54.3 4.7 29.9 11.0	<1	Arsenic	47.3	Ingestion Inhalation Dermal	86.3 3.0 10.7

Table D8.43. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 200 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.17E-05	Cesium-137 Chromium PCB, Total Total PAH Uranium-235 Uranium-238	36.6 4.0 44.4 1.6 2.0 11.3	Ingestion Inhalation Dermal External Exposure	10.3 6.2 34.7 48.8	<1	*no COCs			
Future Child Resident - surface	9.17E-05	Cesium-137 Chromium PCB, Total Total PAH Uranium-235 Uranium-238	36.6 4.0 44.4 1.6 2.0 11.3	Ingestion Inhalation Dermal External Exposure	10.3 6.2 34.7 48.8	<1	Mercury Uranium	56.1 22.9	Ingestion Inhalation Dermal	98.6 1.4
Future Teen Recreational User - surface	1.13E-05	Cesium-137 PCB, Total	12.4 77.3	Ingestion Inhalation Dermal External Exposure	1.8 4.7 76.9 16.6	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.44. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 212

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	3.40E-06	Thorium-230	31.1	Ingestion	35.0	<1	*no COCs				
				Inhalation	4.7						
Future Industrial Worker - surface	6.07E-05	Arsenic Cesium-137 Chromium Neptunium-237 Thorium-230 Uranium-238	23.8	Ingestion	35.0	<1	*no COCs				
				Inhalation	4.7						
				Dermal	18.9						
				External Exposure	41.4						
Outdoor Worker - surface	1.80E-04	Arsenic Cesium-137 Neptunium-237 PCB, Total Plutonium-239/240 Thorium-230 Uranium-238	19.3	Ingestion	83.8	<1	Arsenic Iron	46.5 44.1		Ingestion Inhalation Dermal	89.1 0.4 10.5
				Inhalation	1.2						
				Dermal	4.7						
				External Exposure	10.3						
Outdoor Worker - subsurface	1.81E-04	Arsenic Cesium-137 Chromium Neptunium-237 PCB, Total Plutonium-239/240 Thorium-230 Uranium-238	19.2	Ingestion	83.4	<1	Arsenic Cobalt Iron	24.7 23.5 23.5		Ingestion Inhalation Dermal	91.2 3.2 5.6
				Inhalation	1.6						
				Dermal	4.7						
				External Exposure	10.3						

Table D8.44. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 212 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.26E-06	Thorium-230	65.4	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.65E-04	Arsenic	23.1	Ingestion	39.5	<1	Arsenic	64.4	Ingestion	58.8
		Cesium-137	13.3	Inhalation	1.6				Inhalation	0.8
		Chromium	0.9	Dermal	11.1				Dermal	40.4
		Cobalt-60	0.9	External Exposure	47.8					
		Neptunium-237	28.0							
		PCB, Total	1.1							
		Plutonium-239/240	0.9							
Thorium-230	27.4									
Uranium-235	1.0									
Uranium-238	3.5									
Future Child Resident - surface	2.65E-04	Arsenic	23.1	Ingestion	39.5	1.80	Arsenic Iron	48.8 42.1	Ingestion	85.1
		Cesium-137	13.3	Inhalation	1.6				Inhalation	0.5
		Chromium	0.9	Dermal	11.1				Dermal	14.4
		Cobalt-60	0.9	External Exposure	47.8					
		Neptunium-237	28.0							
		PCB, Total	1.1							
		Plutonium-239/240	0.9							
Thorium-230	27.4									
Uranium-235	1.0									
Uranium-238	3.5									
Future Teen Recreational User - surface	1.64E-05	Arsenic	49.7	Ingestion	16.2	<1	Arsenic	88.5	Ingestion	18.6
		Cesium-137	9.0	Inhalation	2.5				Inhalation	0.7
		Neptunium-237	18.8	Dermal	49.0				Dermal	80.7
		Thorium-230	13.5	External Exposure	32.3					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.45. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 213, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	6.25E-06	Chromium Total PAH Uranium-238	25.3	Ingestion	6.4	<1	*no COCs			
			46.4	Inhalation	26.0					
			21.9	Dermal	48.2					
				External Exposure	19.4					
Outdoor Worker - surface	7.16E-06	Chromium Total PAH Uranium-238	16.4	Ingestion	39.5	<1	*no COCs			
			49.5	Inhalation	16.8					
			27.8	Dermal	31.2					
				External Exposure	12.5					
Outdoor Worker - subsurface	2.95E-05	Arsenic Chromium Total PAH Uranium-238	75.2	Ingestion	67.7	<1	Arsenic	67.7	Ingestion Inhalation Dermal	76.9
			4.5	Inhalation	4.7					7.8
			12.0	Dermal	24.6					15.3
			6.7	External Exposure	3.0					

Table D8.45. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 213, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.98E-05	Chromium PCB, Total Total PAH Uranium-238	15.5 5.8 44.6 34.0	Ingestion Inhalation Dermal External Exposure	14.2 15.9 39.0 30.9	<1	*no COCs			
Future Child Resident - surface	1.98E-05	Chromium PCB, Total Total PAH Uranium-238	15.5 5.8 44.6 34.0	Ingestion Inhalation Dermal External Exposure	14.2 15.9 39.0 30.9	<1	*no COCs			
Future Teen Recreational User - surface	2.72E-06	Total PAH	70.3	Ingestion Inhalation Dermal External Exposure	2.3 10.9 77.4 9.4	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.46. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 213, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.49E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.11E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	1.67E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			

Table D8.46. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 213, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.90E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.90E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.47. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 214

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.78E-05	Arsenic	100.0	Ingestion Inhalation Dermal External Exposure	77.3 0.1 22.7	<1	Arsenic	97.2	Ingestion Inhalation Dermal	77.7 0.4 22.0

Table D8.47. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 214 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	<1E-6	*no COCs			<1	*no COCs			
Future Child Resident - surface	<1E-6	*no COCs			<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

There are no subsurface data available for assessment.

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.48. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 215

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs					
Future Industrial Worker - surface	3.27E-06	Chromium Total PAH	58.0	Ingestion	3.2	<1	*no COCs					
			41.7	Inhalation	58.3							
				Dermal External Exposure	38.5							
Outdoor Worker - surface	3.08E-06	Chromium Total PAH	45.7	Ingestion	23.8	<1	Iron	90.8	Ingestion	99.7		
			54.2	Inhalation	45.9						Inhalation	0.3
				Dermal External Exposure	30.3						Dermal	
Outdoor Worker - subsurface	3.62E-05	Arsenic Chromium Total PAH	67.6	Ingestion	64.8	<1	Arsenic Iron	41.2	Ingestion	90.4		
			3.9	Inhalation	4.0						Inhalation	0.3
			28.5	Dermal External Exposure	31.3						Dermal	9.3

Table D8.48. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 215 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.86E-06	Chromium Total PAH	46.9 52.9	Ingestion Inhalation Dermal External Exposure	11.8 47.1 41.1	<1	*no COCs			
Future Child Resident - surface	7.86E-06	Chromium Total PAH	46.9 52.9	Ingestion Inhalation Dermal External Exposure	11.8 47.1 41.1	<1	Iron	90.6	Ingestion Inhalation Dermal	99.5 0.5
Future Teen Recreational User - surface	1.25E-06	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.49. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 216

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.09E-06	Total PAH	61.6	Ingestion Inhalation Dermal External Exposure	6.8 19.4 56.9 16.9	<1	*no COCs			
Outdoor Worker - surface	4.80E-06	Total PAH Uranium-238	64.2 23.6	Ingestion Inhalation Dermal External Exposure	41.1 12.3 35.9 10.7	<1	*no COCs			
Outdoor Worker - subsurface	2.85E-05	Arsenic Cesium-137 Total PAH Uranium-238	72.7 12.5 10.8 4.0	Ingestion Inhalation Dermal External Exposure	63.3 0.1 22.5 14.1	<1	Arsenic	100.0	Ingestion Inhalation Dermal	77.0 0.4 22.6

Table D8.49. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 216 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	1.31E-05	Chromium Total PAH Uranium-238	11.7 58.8 29.4	Ingestion	15.8	<1	*no COCs			
				Inhalation	11.8					
				Dermal	45.7					
Future Child Resident - surface	1.31E-05	Chromium Total PAH Uranium-238	11.7 58.8 29.4	Ingestion	15.8	<1	*no COCs			
				Inhalation	11.8					
				Dermal	45.7					
Future Teen Recreational User - surface	1.96E-06	Total PAH	84.7	Ingestion	2.3	<1	*no COCs			
				Inhalation	7.4					
				Dermal	82.9					
				External Exposure	7.4					

There are no subsurface data available for assessment.
 Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.50. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 217, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs			<1		*no COCs			
Future Industrial Worker - surface	3.60E-06	Chromium	79.0	Ingestion	2.1	<1	*no COCs			
				Inhalation	81.2					
				Dermal External Exposure	16.7					
Outdoor Worker - surface	3.15E-06	Chromium	66.9	Ingestion	17.1	<1	Cobalt	80.1	Ingestion	94.4
				Inhalation	68.8				Inhalation	5.6
				Dermal External Exposure	14.1				Dermal	
Outdoor Worker - subsurface	2.53E-05	Arsenic Chromium	89.8 6.3	Ingestion	71.4	<1	Arsenic Cobalt	28.0 38.0	Ingestion	89.8
				Inhalation	6.6				Inhalation	3.9
				Dermal External Exposure	20.4 1.7				Dermal	6.3

Table D8.50. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 217, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %			
Future Adult Resident - surface	9.00E-06	Chromium Uranium-238	61.3	Ingestion	3.4	<1	*no COCs					
			37.1	Inhalation	63.0							
				Derma External Exposure	33.6							
Future Child Resident - surface	9.00E-06	Chromium Uranium-238	61.3	Ingestion	3.4	1.09	Cobalt Manganese		Ingestion	91.3		
			37.1	Inhalation	63.0						Inhalation	8.7
				Derma External Exposure	33.6							
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.51. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 217, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.30E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.32E-05	Arsenic Chromium Total PAH	48.3 14.5 36.8	Ingestion Inhalation Dermal External Exposure	15.4 15.0 69.6	<1	*no COCs			
Outdoor Worker - surface	3.99E-05	Arsenic Chromium Total PAH	67.5 6.3 26.1	Ingestion Inhalation Dermal External Exposure	63.6 6.4 29.9	<1	Arsenic Cobalt Iron	23.9 29.0 21.8	Ingestion Inhalation Dermal	92.1 2.5 5.4
Outdoor Worker - subsurface	3.42E-05	Arsenic Chromium Total PAH	70.2 4.7 24.4	Ingestion Inhalation Dermal External Exposure	65.0 5.4 29.6	1.53	Arsenic Cobalt Iron Mercury	9.8 63.5 9.9 7.0	Ingestion Inhalation Dermal	95.8 1.9 2.2

Table D8.51. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 217, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Cobalt	63.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.00E-05	Arsenic	59.2	Ingestion	40.0	<1	Arsenic	38.1	Ingestion	70.0
		Chromium	8.2	Inhalation	8.4				Inhalation	6.1
		Total PAH	32.5	Dermal External Exposure	51.6				Dermal	23.9
Future Child Resident - surface	8.00E-05	Arsenic	59.2	Ingestion	40.0	2.69	Arsenic Cobalt Iron Manganese Mercury	25.3 28.1 21.0 5.9 13.6	Ingestion	88.7
		Chromium	8.2	Inhalation	8.4				Inhalation	3.9
		Total PAH	32.5	Dermal External Exposure	51.6				Dermal	7.4
Future Teen Recreational User - surface	1.25E-05	Arsenic Total PAH	50.2 44.8	Ingestion Inhalation Dermal External Exposure	5.2 5.0 89.8	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.52. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 221

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.31E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.34E-05	Chromium PCB, Total Total PAH Uranium-238	9.9	Ingestion	6.9	<1	*no COCs			
			11.4	Inhalation	10.9					
			73.8	Dermal	77.9					
			4.9	External Exposure	4.3					
Outdoor Worker - surface	2.75E-05	Chromium PCB, Total Total PAH Uranium-238	6.2	Ingestion	41.4	<1	*no COCs			
			11.2	Inhalation	6.9					
			76.6	Dermal	49.0					
			6.0	External Exposure	2.7					
Outdoor Worker - subsurface	5.74E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	51.9	Ingestion	60.0	1.79	Arsenic Cobalt Iron Manganese Mercury	10.4 47.3 10.7 10.1 8.0	Ingestion Inhalation Dermal	92.7 4.9 2.4
			2.8	Inhalation	3.5					
			5.4	Dermal	35.3					
			36.7	External Exposure	1.3					
			2.9							

Table D8.52. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 221 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Cobalt	47.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.05E-05	Chromium PCB, Total Total PAH Uranium-238	6.4 11.1 74.6 7.9	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	7.05E-05	Chromium PCB, Total Total PAH Uranium-238	6.4 11.1 74.6 7.9	Ingestion Inhalation Dermal External Exposure	<1	Iron	71.0	Ingestion Inhalation Dermal	98.6 1.4
Future Teen Recreational User - surface	1.37E-05	PCB, Total Total PAH	12.2 83.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.53. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 222

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.45E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.59E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	6.1 28.8 11.6 6.9 44.5	Ingestion Inhalation Dermal External Exposure	9.8 8.4 35.5 46.2	<1	*no COCs			
Outdoor Worker - surface	3.54E-05	Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	3.3 24.4 10.3 10.4 4.4 47.2	Ingestion Inhalation Dermal External Exposure	51.2 4.5 19.2 25.0	<1	*no COCs			
Outdoor Worker - subsurface	5.58E-05	Arsenic Cesium-137 Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	44.0 4.7 2.8 10.7 6.5 4.5 2.8 23.5	Ingestion Inhalation Dermal External Exposure	59.0 3.4 19.5 18.1	<1	Arsenic	57.0	Ingestion Inhalation Dermal	82.0 5.1 12.9

Table D8.53. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 222 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.02E-04	Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	3.0 21.5 8.9 2.1 8.8 55.6	Ingestion Inhalation Dermal External Exposure	13.5 4.1 23.1 59.2	<1	*no COCs			
Future Child Resident - surface	1.02E-04	Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	3.0 21.5 8.9 2.1 8.8 55.6	Ingestion Inhalation Dermal External Exposure	13.5 4.1 23.1 59.2	<1	Uranium	65.1	Ingestion Inhalation Dermal	97.1 2.9
Future Teen Recreational User - surface	9.67E-06	PCB, Total Total PAH Uranium-238	48.4 20.4 23.7	Ingestion Inhalation Dermal External Exposure	3.5 4.1 66.4 26.0	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.54. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 227, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	3.79E-06	PCB, Total Uranium-238	32.6	Ingestion	8.7	<1	*no COCs				
			40.2	Inhalation	4.9						
Future Industrial Worker - surface	6.77E-05	Cesium-137 Chromium Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	3.3	Ingestion	8.7	<1	*no COCs				
			2.3	Inhalation	4.9						
			4.9	Dermal	35.9						
			32.6	External Exposure	50.5						
			8.4								
5.6											
40.2											
Outdoor Worker - surface	8.78E-05	Cesium-137 Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	1.9	Ingestion	47.9	<1	Uranium	75.5	Ingestion Inhalation Dermal	98.6 1.4	
			1.3	Inhalation	2.8						
			3.1	Dermal	20.5						
			29.1	External Exposure	28.8						
			7.9								
			6.2								
			3.7								
45.0											
Outdoor Worker - subsurface	1.02E-04	Arsenic Cesium-137 Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	20.0	Ingestion	53.5	<1	Arsenic Uranium	41.7 38.7	Ingestion Inhalation Dermal	89.7 0.8 9.4	
			1.4	Inhalation	2.5						
			1.3	Dermal	21.5						
			2.4	External Exposure	22.4						
			23.9								
			6.8								
			4.9								
			2.9								
			35.0								

Table D8.54. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 227, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.27E-06			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.74E-04	Cesium-137 Chromium Cobalt-60 Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	4.1 1.1 1.6 6.1 23.7 6.3 1.2 6.9 48.8	Ingestion Inhalation Dermal External Exposure	12.1 2.3 22.8 62.9	<1	*no COCs			
Future Child Resident - surface	2.74E-04	Cesium-137 Chromium Cobalt-60 Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	4.1 1.1 1.6 6.1 23.7 6.3 1.2 6.9 48.8	Ingestion Inhalation Dermal External Exposure	12.1 2.3 22.8 62.9	<1	Nickel Uranium	24.3 75.0	Ingestion Inhalation Dermal	97.8 2.2
Future Teen Recreational User - surface	2.55E-05	PCB, Total Total PAH Uranium-238	54.2 14.7 21.2	Ingestion Inhalation Dermal External Exposure	3.1 2.3 66.5 28.1	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.55. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 227, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.05E-06	PCB, Total	84.8	Ingestion	6.2	<1	*no COCs	<1		
			11.3	Inhalation	11.3					
			78.1	Dermal	78.1					
			4.4	External Exposure	4.4					
Future Industrial Worker - surface	3.66E-05	Chromium PCB, Total Total PAH	5.1	Ingestion	6.2	<1	*no COCs	<1		
			84.8	Inhalation	11.3					
			5.3	Dermal	78.1					
				External Exposure	4.4					
Outdoor Worker - surface	4.16E-05	Chromium PCB, Total Total PAH Uranium-238	3.3	Ingestion	39.0	<1	Cobalt	43.1	Ingestion Inhalation Dermal	99.0 1.0
			86.3	Inhalation	7.3					
			5.7	Dermal	50.8					
			3.2	External Exposure	2.8					
Outdoor Worker - subsurface	5.50E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	36.6	Ingestion	53.0	<1	Arsenic Cobalt	28.3 28.1	Ingestion Inhalation Dermal	90.1 3.5 6.4
			2.0	Inhalation	4.6					
			53.3	Dermal	40.1					
			4.3	External Exposure	2.3					

Table D8.55. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 227, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.09E-04	Chromium Cobalt-60 PCB, Total Total PAH Uranium-238	3.3 3.6 83.4 5.4 4.2	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	1.09E-04	Chromium Cobalt-60 PCB, Total Total PAH Uranium-238	3.3 3.6 83.4 5.4 4.2	Ingestion Inhalation Dermal External Exposure	<1	Cobalt Mercury	43.2 39.7	Ingestion Inhalation Dermal	98.4 1.6
Future Teen Recreational User - surface	2.15E-05	PCB, Total Total PAH	90.8 6.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.56. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 228

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs					
Future Industrial Worker - surface	1.30E-05	Chromium	48.1	Ingestion	2.9	<1	*no COCs					
		Neptunium-237	22.7	Inhalation	48.3							
		Total PAH	8.7	Dermal	8.0							
		Uranium-238	17.0	External Exposure	40.8							
Outdoor Worker - surface	1.21E-05	Chromium	38.4	Ingestion	22.5	<1	Mercury	62.5	Ingestion	96.3		
		Neptunium-237	20.2	Inhalation	38.5						Inhalation	0.6
		Total PAH	11.4	Dermal	6.4							
		Uranium-238	26.6	External Exposure	32.6							
Outdoor Worker - subsurface	7.99E-05	Arsenic	84.2	Ingestion	68.5	<1	Arsenic Iron Mercury	51.0 22.8 13.2	Ingestion Inhalation Dermal	85.5 2.3 12.2		
		Chromium	5.8	Inhalation	5.9							
		Neptunium-237	3.1	Dermal	20.1							
		Total PAH	1.7	External Exposure	5.6							
Uranium-238	4.0											

Table D8.56. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 228 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Arsenic	51.0	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.36E-05	Chromium Neptunium-237 Total PAH Uranium-235 Uranium-238	27.9 34.0 7.9 5.2 25.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	4.36E-05	Chromium Neptunium-237 Total PAH Uranium-235 Uranium-238	27.9 34.0 7.9 5.2 25.0	Ingestion Inhalation Dermal External Exposure	<1	Mercury	61.4	Ingestion Inhalation Dermal	94.7 1.0 4.3
Future Teen Recreational User - surface	3.04E-06	Chromium	37.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.57. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 27

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface	<1E-6					<1	*no COCs			

Table D8.57. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 27 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

There are no surface data available for assessment.
 Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.58. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 76

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	1.79E-06	Total PAH	93.0	Ingestion	7.6	<1	*no COCs				
				Inhalation	0.5						
Future Industrial Worker - surface	3.19E-05	PCB, Total Total PAH	4.3 93.0	Ingestion	7.6	<1	*no COCs				
				Inhalation	0.5						
				Dermal	89.6						
				External Exposure	2.4						
Outdoor Worker - surface	3.91E-05	PCB, Total Total PAH Uranium-238	4.1 92.7 3.2	Ingestion	44.1	<1	*no COCs				
				Inhalation	0.3						
				Dermal	54.2						
				External Exposure	1.4						
Outdoor Worker - subsurface	7.07E-05	Arsenic PCB, Total Total PAH Uranium-238	44.7 2.3 51.3 1.8	Ingestion	58.9	<1	Arsenic	68.3		Ingestion	84.1
				Inhalation	0.2					Inhalation	0.4
				Dermal	40.1					Dermal	15.5
				External Exposure	0.8						

Table D8.58. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 76 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.87E-05	PCB, Total Total PAH Uranium-238	4.1 91.6 4.2	Ingestion Inhalation Dermal External Exposure	21.6 0.3 74.3 3.9	<1	*no COCs			
Future Child Resident - surface	9.87E-05	PCB, Total Total PAH Uranium-238	4.1 91.6 4.2	Ingestion Inhalation Dermal External Exposure	21.6 0.3 74.3 3.9	<1	*no COCs			
Future Teen Recreational User - surface	2.06E-05	Total PAH	95.0	Ingestion Inhalation Dermal External Exposure	2.1 0.1 97.0 0.8	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.59. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 165

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	1.29E-05	Arsenic	27.7	Ingestion	13	<1	*no COCs				
		Cesium-137	17.5	Inhalation	2.4						
		PCB, Total	19.2	Dermal	49.7						
		Total PAH	13.7	External Exposure	35						
		Uranium-238	16.4								
		Arsenic	27.7	Ingestion	13						28.9
		Cesium-137	17.5	Inhalation	2.4						5.9
Future Industrial Worker - surface	2.30E-04	Chromium	0.5	Dermal	49.7					65.2	
		Neptunium-237	0.7	External Exposure	35						
		PCB, Total	19.2								
		Total PAH	13.7								
		Uranium-234	1.3								
		Uranium-235	2.3								
		Uranium-238	16.4								
Outdoor Worker - surface	3.59E-04	Arsenic	42.6	Ingestion	58.8	1.16	Arsenic Uranium	82.4 10.8	Ingestion Inhalation Dermal	79.6 1.7 18.7	
		Cesium-137	8.4	Inhalation	1.1						
		Neptunium-237	0.4	Dermal	23.5						
		PCB, Total	14.2	External Exposure	16.5						
		Plutonium-239/240	0.5								
		Thorium-230	0.8								
		Total PAH	10.7								
		Uranium-234	5.7								
		Uranium-235	1.3								
		Uranium-238	15.2								
		Outdoor Worker - subsurface	3.72E-04	Arsenic	41.3						Ingestion
Cesium-137	8.1			Inhalation	1.2						
Neptunium-237	0.3			Dermal	24.5						
PCB, Total	16.4			External Exposure	16.0						
Pentachlorophenol	0.5										
Plutonium-239/240	0.5										
Thorium-230	0.7										
Total PAH	10.4										
Uranium-234	5.5										
Uranium-235	1.2										
Uranium-238	14.7										

Table D8.59. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 165 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	4.65E-06	Arsenic	41.3	See Outdoor Worker (subsurface)	<1	<1	Arsenic	74.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	9.36E-04	Arsenic	28.8	Ingestion	24.4	<1	Arsenic	89.2	Ingestion	41.1
		Cesium-137	21.7	Inhalation	1.1		Inhalation	2.8		
		Chromium	0.3	Dermal	31.3		Dermal	56.1		
		Naphthalene	0.2	External	43.3					
		Neptunium-237	0.8	Exposure						
		PCB, Total	13.8							
		Plutonium-239/240	0.1							
		Thorium-230	0.2							
Future Child Resident - surface	9.36E-04	Total PAH	10.3			4.65	Arsenic	83.0	Ingestion	73.0
		Uranium-234	1.3				Uranium	9.9	Inhalation	2.5
		Uranium-235	2.8				Dermal	24.5		
		Uranium-238	19.8							
		Arsenic	28.8	Ingestion	24.4					
		Cesium-137	21.7	Inhalation	1.1					
		Chromium	0.3	Dermal	31.3					
		Naphthalene	0.2	External	43.3					
		Neptunium-237	0.8	Exposure						
		PCB, Total	13.8							
		Plutonium-239/240	0.1							
		Thorium-230	0.2							
		Future Teen Recreational User - surface	1.02E-04	Total PAH	10.3				<1	Arsenic
Uranium-234	1.3					Inhalation	2.1			
Uranium-235	2.8					Dermal	87.7			
Uranium-238	19.8									
Arsenic	35.0			Ingestion	4.8					
Cesium-137	8.3			Inhalation	1.0					
PCB, Total	27.0			Dermal	77.8					
Uranium-235	20.3	External	16.5							
Uranium-238	1.1	Exposure								
			7.3							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.60. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 170

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.32E-06	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.66E-06	Uranium-238	78.8	Ingestion Inhalation Dermal	45.6 0.1	<1	*no COCs			
Outdoor Worker - subsurface	5.83E-06	Cesium-137 Uranium-238	49.9 37.3	Ingestion Inhalation Dermal External Exposure	21.7 0.1 78.3	<1	*no COCs			

Table D8.60. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 170 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	6.55E-06	Neptunium-237 Uranium-238	32.5	Ingestion	<1	*no COCs			
			67.5	Inhalation Dermal External Exposure					
Future Child Resident - surface	6.55E-06	Neptunium-237 Uranium-238	32.5	Ingestion	<1	*no COCs			
			67.5	Inhalation Dermal External Exposure					
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.61. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 158

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.18E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.11E-05	Arsenic Chromium Total PAH Uranium-238	48.1 9.5 29.5 10.6	Ingestion Inhalation Dermal External Exposure	16.0 10.0 62.7 11.3	<1	*no COCs			
Outdoor Worker - surface	3.71E-05	Arsenic Chromium Total PAH Uranium-238	65.7 4.0 20.5 8.7	Ingestion Inhalation Dermal External Exposure	64.7 4.2 26.4 4.7	<1	Arsenic Cobalt Mercury	27.0 33.7 21.5	Ingestion Inhalation Dermal	90.3 3.6 6.1
Outdoor Worker - subsurface	3.73E-05	Arsenic Chromium Total PAH Uranium-238	61.5 3.4 26.5 7.2	Ingestion Inhalation Dermal External Exposure	63.3 3.5 28.8 4.4	<1	Arsenic Cobalt Mercury	27.3 28.1 23.1	Ingestion Inhalation Dermal	89.9 3.9 6.2

Table D8.61. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 158 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.90E-05	Arsenic	54.4	Ingestion	<1	Arsenic	41.3	Ingestion	65.8
		Chromium	4.9	Inhalation		Inhalation		8.3	
		Total PAH	24.0	Dermal		Dermal		25.9	
		Uranium-235	2.6	External Exposure					
		Uranium-238	13.9						
Future Child Resident - surface	7.90E-05	Arsenic	54.4	Ingestion	2.17	Arsenic	28.3	Ingestion	86.2
		Chromium	4.9	Inhalation		Cobalt		5.4	
		Total PAH	24.0	Dermal		Manganese		8.3	
		Uranium-235	2.6	External Exposure		Mercury		20.5	
		Uranium-238	13.9						
Future Teen Recreational User - surface	1.07E-05	Arsenic	53.3	Ingestion	<1	*no COCs			
		Total PAH	38.3	Inhalation					
				Dermal					
				External Exposure					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.62. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 169

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	9.22E-06	Arsenic	12.4	Ingestion	9.4	<1	*no COCs			
		PCB, Total	32.4	Inhalation	6.8					
		Total PAH	47.1	Dermal	80.5					
				External Exposure	3.3					
Future Industrial Worker - surface	1.65E-04	Arsenic	12.4	Ingestion	9.4	<1	Arsenic	58.8	Ingestion Inhalation Dermal	51.8 5.3 42.9
		Chromium	4.3	Inhalation	6.8					
		PCB, Total	32.4	Dermal	80.5					
		Total PAH	47.1	External Exposure	3.3					
		Uranium-235	0.7							
		Uranium-238	2.9							
Outdoor Worker - surface	2.21E-04	Arsenic	22.2	Ingestion	50.0	<1	Arsenic Iron Nickel	34.7 23.5 11.4	Ingestion Inhalation Dermal	91.2 1.0 7.9
		Chromium	2.4	Inhalation	3.7					
		PCB, Total	27.9	Dermal	44.4					
		Total PAH	42.8	External Exposure	1.8					
		Uranium-234	1.0							
		Uranium-235	0.5							
Uranium-238	3.1									
Outdoor Worker - subsurface	2.21E-04	Arsenic	22.1	Ingestion	49.9	1.97	Arsenic Cobalt Iron Nickel	15.5 46.4 10.5 7.5	Ingestion Inhalation Dermal	94.0 2.5 3.5
		Chromium	2.4	Inhalation	3.8					
		PCB, Total	27.9	Dermal	44.3					
		Total PAH	42.7	External Exposure	1.9					
		Uranium-234	1.0							
		Uranium-235	0.5							
Uranium-238	3.1									

Table D8.62. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 169 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.77E-06	Total PAH	42.7	See Outdoor Worker (subsurface)	<1	<1	Cobalt	46.4	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.23E-04	Arsenic	16.5	Ingestion	25.8	<1	Arsenic	52.1	Ingestion	65.1
		Chromium	2.6	Inhalation	4.1				Inhalation	2.2
		PCB, Total	29.9	Dermal	64.9				Dermal	32.7
		Total PAH	45.1	External Exposure	5.2					
		Uranium-234	0.3							
		Uranium-235	1.1							
		Uranium-238	4.5							
Future Child Resident - surface	5.23E-04	Arsenic	16.5	Ingestion	25.8	3.36	Aluminum Arsenic Copper Iron Mercury Nickel Uranium	5.8 36.7 3.6 22.6 10.0 11.3 6.4	Ingestion	87.7
		Chromium	2.6	Inhalation	4.1				Inhalation	1.5
		PCB, Total	29.9	Dermal	64.9				Dermal	10.8
		Total PAH	45.1	External Exposure	5.2					
		Uranium-234	0.3							
		Uranium-235	1.1							
		Uranium-238	4.5							
Future Teen Recreational User - surface	9.84E-05	Arsenic	11.6	Ingestion	2.8	<1	Arsenic	81.4	Ingestion	23.4
		Chromium	1.3	Inhalation	2.1				Inhalation	2.4
		PCB, Total	34.0	Dermal	94.0				Dermal	74.2
		Total PAH	51.8	External Exposure	1.1					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.63. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 19

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.94E-06	Total PAH	100.0	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.2					
				Dermal External Exposure	92.3					
Future Industrial Worker - surface	8.83E-05	Total PAH	100.0	Ingestion	7.6	<1	*no COCs			
				Inhalation	0.2					
				Dermal External Exposure	92.3					
Outdoor Worker - surface	1.08E-04	Total PAH	100.0	Ingestion	44.0	<1	*no COCs			
				Inhalation	0.1					
				Dermal External Exposure	56.0					
Outdoor Worker - subsurface	1.71E-04	Arsenic Total PAH Uranium-234 Uranium-235 Uranium-238	14.2 63.0 5.7 1.7 15.3	Ingestion	53.0	<1	Arsenic Cobalt Copper Uranium	18.2 18.9 18.7 22.8	Ingestion Inhalation Dermal	94.1 0.9 5.0
				Inhalation	0.2					
				Dermal	38.5					
				External Exposure	8.3					

Table D8.63. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 19 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.14E-06	Total PAH	63.0	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.69E-04	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	22.2 0.1 77.7	<1	*no COCs			
Future Child Resident - surface	2.69E-04	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	22.2 0.1 77.7	<1	Thallium	83.1	Ingestion Inhalation Dermal	95.0 0.4 4.6
Future Teen Recreational User - surface	5.81E-05	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	2.1 0.0 97.9	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.64. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 138, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.68E-05	Arsenic Chromium PCB, Total Total PAH	63.6 10.7 15.9 9.8	Ingestion Inhalation Dermal External Exposure	18.4 12.0 69.6	<1	*no COCs			
Outdoor Worker - surface	3.20E-05	Arsenic Chromium PCB, Total Total PAH	79.9 4.1 9.6 6.3	Ingestion Inhalation Dermal External Exposure	68.4 4.6 27.0	<1	Arsenic Mercury	39.6 37.3	Ingestion Inhalation Dermal	88.8 0.4 10.8
Outdoor Worker - subsurface	3.25E-05	Arsenic Chromium PCB, Total Total PAH	79.9 4.3 9.5 6.2	Ingestion Inhalation Dermal External Exposure	68.3 4.9 26.8	<1	Arsenic Cobalt Mercury	21.9 14.5 22.8	Ingestion Inhalation Dermal	92.0 2.1 5.8

Table D8.64. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 138, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.14E-05	Arsenic	73.4	Ingestion	45.0	<1	Arsenic	54.3	Ingestion	58.1
		Chromium	5.6	Inhalation	6.3		Inhalation	0.9		
		PCB, Total	12.8	Dermal	48.7		Dermal	41.0		
		Total PAH	8.2	External Exposure						
Future Child Resident - surface	6.14E-05	Arsenic	73.4	Ingestion	45.0	1.56	Antimony	11.1	Ingestion	84.7
		Chromium	5.6	Inhalation	6.3		Arsenic	41.5	Inhalation	0.6
		PCB, Total	12.8	Dermal	48.7		Cadmium	7.1	Dermal	14.7
		Total PAH	8.2	External Exposure			Mercury	35.5		
Future Teen Recreational User - surface	9.07E-06	Arsenic	66.0	Ingestion	6.2	<1	*no COCs			
		PCB, Total	18.4	Inhalation	4.0					
		Total PAH	11.9	Dermal	89.8					
				External Exposure						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.65. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 138, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.15E-06	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.37E-06	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.78E-05	Arsenic Chromium	89.5 5.5	Ingestion Inhalation Dermal External Exposure	71.3 5.7 23.0	<1	Arsenic	52.7	Ingestion Inhalation Dermal	87.3 0.5 12.2

Table D8.65. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 138, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.43E-06	PCB, Total Total PAH	42.0 57.5	Ingestion Inhalation Dermal External Exposure	21.2 2.5 76.3	<1	*no COCs			
Future Child Resident - surface	3.43E-06	PCB, Total Total PAH	42.0 57.5	Ingestion Inhalation Dermal External Exposure	21.2 2.5 76.3	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.66. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.30E-06	Arsenic	97.6	Ingestion Inhalation Dermal External Exposure	25.5 2.6 71.9	<1	*no COCs			
Future Industrial Worker - surface	7.69E-05	Arsenic Chromium	97.6 2.4	Ingestion Inhalation Dermal External Exposure	25.5 2.6 71.9	<1	Arsenic	96.4	Ingestion Inhalation Dermal	28.3 1.3 70.4
Outdoor Worker - surface	1.82E-04	Arsenic Chromium	99.2 0.7	Ingestion Inhalation Dermal External Exposure	76.7 0.8 22.5	1.24	Arsenic	90.6	Ingestion Inhalation Dermal	79.1 0.4 20.5
Outdoor Worker - subsurface	1.84E-04	Arsenic Chromium	99.1 0.8	Ingestion Inhalation Dermal External Exposure	76.6 0.9 22.5	1.48	Arsenic Cobalt	76.9 10.9	Ingestion Inhalation Dermal	81.2 1.4 17.4

Table D8.66. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.30E-06	Arsenic	99.1	See Outdoor Worker (subsurface)	<1	<1	Arsenic	76.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.21E-04	Arsenic Chromium	98.9 1.1	Ingestion Inhalation Dermal External Exposure	54.7 1.2 44.1	<1	Arsenic	95.2	Ingestion Inhalation Dermal	39.6 0.6 59.7
Future Child Resident - surface	3.21E-04	Arsenic Chromium	98.9 1.1	Ingestion Inhalation Dermal External Exposure	54.7 1.2 44.1	4.98	Arsenic Mercury	91.3 7.1	Ingestion Inhalation Dermal	72.6 0.6 26.9
Future Teen Recreational User - surface	4.25E-05	Arsenic	99.2	Ingestion Inhalation Dermal External Exposure	8.4 0.8 90.8	<1	Arsenic	98.8	Ingestion Inhalation Dermal	9.5 0.4 90.1

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.67. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.57E-05	Arsenic	80.7	Ingestion	21.8	<1	*no COCs			
		Chromium	9.4	Inhalation	9.6					
		Total PAH	9.9	Dermal External Exposure	68.6					
Outdoor Worker - surface	3.35E-05	Arsenic	91.1	Ingestion	72.8	<1	Arsenic	90.7	Ingestion Inhalation Dermal	78.8 0.7 20.5
		Chromium	3.3	Inhalation	3.3					
		Total PAH	5.7	Dermal External Exposure	23.8					
Outdoor Worker - subsurface	3.15E-05	Arsenic	89.3	Ingestion	71.6	<1	Arsenic	55.1	Ingestion Inhalation Dermal	83.6 3.9 12.5
		Chromium	4.7	Inhalation	4.8					
		Total PAH	6.0	Dermal External Exposure	23.6					

Table D8.67. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.13E-05	Arsenic	87.6	Ingestion	50.1	<1	Arsenic	95.0	Ingestion	39.3
		Chromium	4.7	Inhalation	4.8				Inhalation	1.1
		Total PAH	7.7	Dermal External Exposure	45.1				Dermal	59.6
Future Child Resident - surface	6.13E-05	Arsenic	87.6	Ingestion	50.1	<1	Arsenic	91.3	Ingestion	72.1
		Chromium	4.7	Inhalation	4.8				Inhalation	1.0
		Total PAH	7.7	Dermal External Exposure	45.1				Dermal	26.9
Future Teen Recreational User - surface	8.43E-06	Arsenic	84.7	Ingestion	7.4	<1	*no COCs			
		Total PAH	12.1	Inhalation	3.3					
				Dermal External Exposure	89.3					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.68. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.50E-05	Arsenic Chromium	89.5	Ingestion	23.4	<1	*no COCs			
			10.4	Inhalation	10.6					
				Dermal External Exposure	66.0					
Outdoor Worker - surface	3.33E-05	Arsenic Chromium	96.5	Ingestion	74.6	<1	Arsenic	90.8	Ingestion Inhalation Dermal	78.9 0.6 20.5
			3.5	Inhalation	3.5					
				Dermal External Exposure	21.9					
Outdoor Worker - subsurface	3.41E-05	Arsenic Chromium	96.1	Ingestion	74.2	<1	Arsenic	76.4	Ingestion Inhalation Dermal	79.1 3.7 17.3
			3.9	Inhalation	4.0					
				Dermal External Exposure	21.8					

Table D8.68. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.97E-05	Arsenic Chromium	94.9 5.1	Ingestion Inhalation Dermal External Exposure	52.5 5.2 42.4	<1	Arsenic	95.1	Ingestion Inhalation Dermal	39.4 1.0 59.7
Future Child Resident - surface	5.97E-05	Arsenic Chromium	94.9 5.1	Ingestion Inhalation Dermal External Exposure	52.5 5.2 42.4	<1	Arsenic	91.4	Ingestion Inhalation Dermal	72.2 0.9 26.9
Future Teen Recreational User - surface	7.82E-06	Arsenic	96.4	Ingestion Inhalation Dermal External Exposure	8.2 3.7 88.1	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.69. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.39E-05	Arsenic Chromium	83.0 14.3	Ingestion Inhalation Dermal External Exposure	21.9 14.5 63.6	<1	*no COCs			
Outdoor Worker - surface	2.97E-05	Arsenic Chromium	93.5 5.0	Ingestion Inhalation Dermal External Exposure	72.9 5.0 22.1	<1	Arsenic	51.3	Ingestion Inhalation Dermal	84.5 3.9 11.6
Outdoor Worker - subsurface	2.85E-05	Arsenic Chromium	93.6 5.2	Ingestion Inhalation Dermal External Exposure	72.8 5.3 21.9	<1	Arsenic Cobalt	31.8 21.7	Ingestion Inhalation Dermal	89.7 3.1 7.2

Table D8.69. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 180, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.39E-05	Arsenic	90.8	Ingestion	50.6	<1	Arsenic	65.4	Ingestion	51.4
		Chromium	7.2	Inhalation	7.3		Inhalation	7.6		
		Total PAH	2.1	Dermal External Exposure	42.1		Dermal	41.0		
Future Child Resident - surface	5.39E-05	Arsenic	90.8	Ingestion	50.6	1.34	Arsenic	52.5	Ingestion	78.7
		Chromium	7.2	Inhalation	7.3		Iron	21.0	Inhalation	5.8
		Total PAH	2.1	Dermal External Exposure	42.1		Manganese	9.9	Dermal	15.5
							Vanadium	9.3		
Future Teen Recreational User - surface	7.11E-06	Arsenic	91.5	Ingestion	7.8	<1	*no COCs			
				Inhalation	5.2					
				Dermal External Exposure	87.0					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.70. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 181

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.34E-06	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.27E-06	*no COCs				<1	Thallium	100.0	Ingestion Inhalation Dermal	100.0
Outdoor Worker - subsurface	2.19E-06					<1	Thallium	99.9	Ingestion Inhalation Dermal	100.0

Table D8.70. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 181 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.23E-06	Chromium Total PAH	45.4 54.6	Ingestion Inhalation Dermal External Exposure	12.1 45.5 42.4	<1	*no COCs			
Future Child Resident - surface	3.23E-06	Chromium Total PAH	45.4 54.6	Ingestion Inhalation Dermal External Exposure	12.1 45.5 42.4	<1	Thallium	100.0	Ingestion Inhalation Dermal	100.0
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.71. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.10E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.56E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	3.32E-05	Arsenic Cesium-137 Chromium	85.1 9.7 4.3	Ingestion Inhalation Dermal External Exposure	66.2 4.4 19.8 9.6	<1	Arsenic	83.7	Ingestion Inhalation Dermal	80.4 0.6 18.9

Table D8.71. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.08E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	4.08E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.72. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.95E-06	Chromium	76.8	Ingestion Inhalation Dermal External Exposure	1.8 76.8 21.4	<1	*no COCs			
Outdoor Worker - surface	1.66E-06	Chromium	66.7	Ingestion Inhalation Dermal External Exposure	14.6 66.8 18.6	<1	*no COCs			
Outdoor Worker - subsurface	1.78E-06	Chromium	77.6	Ingestion Inhalation Dermal External Exposure	9.8 77.7 12.5	<1	*no COCs			

Table D8.72. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.29E-06	Chromium Total PAH	67.8 32.2	Ingestion Inhalation Dermal External Exposure	7.1 67.9 25.0	<1	*no COCs			
Future Child Resident - surface	4.29E-06	Chromium Total PAH	67.8 32.2	Ingestion Inhalation Dermal External Exposure	7.1 67.9 25.0	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.73. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.36E-06	Chromium	70.7	Ingestion	2.2	<1	*no COCs			
				Inhalation	71.0					
				Dermal External Exposure	26.8					
Outdoor Worker - surface	2.07E-06	Chromium	59.5	Ingestion	17.7	<1	*no COCs			
				Inhalation	59.7					
				Dermal External Exposure	22.6					
Outdoor Worker - subsurface	2.81E-05	Arsenic Chromium	92.9 4.6	Ingestion	72.9	<1	Arsenic	81.2	Ingestion	76.9
				Inhalation	4.7				Inhalation	4.7
				Dermal External Exposure	22.4				Dermal	18.4

Table D8.73. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	5.33E-06	Chromium Total PAH	60.6 39.2	Ingestion Inhalation Dermal External Exposure	8.7 60.9 30.4	<1	*no COCs			
Future Child Resident - surface	5.33E-06	Chromium Total PAH	60.6 39.2	Ingestion Inhalation Dermal External Exposure	8.7 60.9 30.4	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.74. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.76E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.30E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.55E-05	Arsenic Chromium	95.1 4.9	Ingestion Inhalation Dermal External Exposure	73.5 4.9 21.6	<1	Arsenic	80.7	Ingestion Inhalation Dermal	81.0 0.7 18.3

Table D8.74. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.41E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.41E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.75. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.32E-06	Chromium	82.1	Ingestion	1.3	<1	*no COCs			
				Inhalation	82.5					
				Dermal External Exposure	16.1					
Outdoor Worker - surface	1.91E-06	Chromium	73.8	Ingestion	11.4	<1	*no COCs			
				Inhalation	74.1					
				Dermal External Exposure	14.5					
Outdoor Worker - subsurface	2.61E-05	Arsenic Cesium-137 Chromium	81.3 11.3 5.4	Ingestion	63.8	<1	Arsenic	74.8	Ingestion	82.4
				Inhalation	5.5				Inhalation	0.7
				Dermal External Exposure	19.5 11.2				Dermal	16.9

Table D8.75. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	4.94E-06	Chromium Total PAH	74.7 25.0	Ingestion Inhalation Dermal External Exposure	5.5 75.0 19.4	<1	*no COCs			
Future Child Resident - surface	4.94E-06	Chromium Total PAH	74.7 25.0	Ingestion Inhalation Dermal External Exposure	5.5 75.0 19.4	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.76. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 6

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	5.67E-06	Chromium Total PAH	26.0 73.8	Ingestion Inhalation Dermal External Exposure	5.6 26.3 68.1	<1	*no COCs			
Outdoor Worker - surface	6.21E-06	Chromium Total PAH	17.6 82.3	Ingestion Inhalation Dermal External Exposure	36.2 17.8 46.0	<1	*no COCs			
Outdoor Worker - subsurface	3.25E-05	Arsenic Cesium-137 Chromium Total PAH	77.7 6.0 4.2 12.1	Ingestion Inhalation Dermal External Exposure	65.4 4.2 24.4 6.0	<1	Arsenic	86.3	Ingestion Inhalation Dermal	79.7 0.8 19.5

Table D8.76. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.56E-05	Chromium Total PAH	18.3 81.6	Ingestion Inhalation Dermal External Exposure	18.1 18.5 63.4	<1	*no COCs			
Future Child Resident - surface	1.56E-05	Chromium Total PAH	18.3 81.6	Ingestion Inhalation Dermal External Exposure	18.1 18.5 63.4	<1	*no COCs			
Future Teen Recreational User - surface	3.03E-06	Total PAH	91.1	Ingestion Inhalation Dermal External Exposure	1.9 9.0 89.1	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.77. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 7

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.63E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.21E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.17E-05	Arsenic Chromium	94.5 5.4	Ingestion Inhalation Dermal External Exposure	73.0 5.6 21.4	<1	Arsenic Cobalt	48.0 49.9	Ingestion Inhalation Dermal	88.4 0.8 10.9

Table D8.77. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 7 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.17E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.17E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.78. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 8

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.76E-05	Arsenic	66.0	Ingestion	18.8	<1	*no COCs			
		Chromium	12.8	Inhalation	13.4					
		Total PAH	20.7	Dermal External Exposure	67.8					
Outdoor Worker - surface	3.40E-05	Arsenic	81.9	Ingestion	69.0	<1	Arsenic Cobalt	40.5 49.7	Ingestion Inhalation Dermal	90.0 0.9 9.2
		Chromium	4.9	Inhalation	5.1					
		Total PAH	13.1	Dermal External Exposure	25.9					
Outdoor Worker - subsurface	3.32E-05	Arsenic	80.8	Ingestion	66.4	<1	Arsenic Cobalt	40.9 40.2	Ingestion Inhalation Dermal	87.2 3.6 9.2
		Cesium-137	6.4	Inhalation	4.0					
		Chromium	3.9	Dermal	23.3					
		Total PAH	8.8	External Exposure	6.3					

Table D8.78. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 8 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.47E-05	Arsenic Chromium Total PAH	75.9 6.8 17.1	Ingestion Inhalation Dermal External Exposure	45.8 7.0 47.2	<1	Arsenic	58.2	Ingestion Inhalation Dermal	61.6 1.9 36.5
Future Child Resident - surface	6.47E-05	Arsenic Chromium Total PAH	75.9 6.8 17.1	Ingestion Inhalation Dermal External Exposure	45.8 7.0 47.2	1.65	Arsenic Cobalt Vanadium	42.6 47.9 6.3	Ingestion Inhalation Dermal	86.1 1.3 12.5
Future Teen Recreational User - surface	9.34E-06	Arsenic Total PAH	69.8 25.7	Ingestion Inhalation Dermal External Exposure	6.4 4.6 89.0	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.79. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 9

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.02E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.50E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.64E-05	Arsenic Chromium	94.3 5.6	Ingestion Inhalation Dermal External Exposure	72.9 5.7 21.4	<1	Arsenic	87.0	Ingestion Inhalation Dermal	79.5 0.8 19.7

Table D8.79. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 9 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.93E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.93E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.80. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 10

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.50E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.11E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.47E-05	Arsenic Chromium	95.7 4.2	Ingestion Inhalation Dermal External Exposure	74.0 4.3 21.7	<1	Arsenic	79.0	Ingestion Inhalation Dermal	78.2 4.0 17.9

Table D8.80. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 10 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.91E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.91E-06	Chromium	99.5	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.81. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 11

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.53E-05	Arsenic Chromium	88.4 11.0	Ingestion Inhalation Dermal External Exposure	23.1 11.8 65.1	<1	*no COCs			
Outdoor Worker - surface	3.38E-05	Arsenic Chromium	96.1 3.7	Ingestion Inhalation Dermal External Exposure	74.2 4.0 21.8	<1	Aluminum Arsenic Cobalt	12.3 24.3 39.0	Ingestion Inhalation Dermal	93.2 1.3 5.5
Outdoor Worker - subsurface	3.51E-05	Arsenic Cesium-137 Chromium	88.9 5.3 4.0	Ingestion Inhalation Dermal External Exposure	69.5 4.2 21.1 5.2	<1	Arsenic Cobalt Iron	28.0 31.5 15.0	Ingestion Inhalation Dermal	91.3 2.3 6.3

Table D8.81. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 11 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.06E-05	Arsenic Chromium	94.3 5.4	Ingestion	52.1	<1	Arsenic Cobalt	39.5	Ingestion	72.1
				Inhalation	5.8				Inhalation	3.1
				Dermal External Exposure	42.1				Dermal	24.8
Future Child Resident - surface	6.06E-05	Arsenic Chromium	94.3 5.4	Ingestion	52.1	3.16	Aluminum Arsenic Cobalt Iron Thallium Vanadium	12.2 25.9 38.1 11.4 3.3 6.5	Ingestion	90.4
				Inhalation	5.8				Inhalation	1.9
				Dermal External Exposure	42.1				Dermal	7.6
Future Teen Recreational User - surface	7.92E-06	Arsenic	95.9	Ingestion Inhalation Dermal External Exposure	8.1 4.1 87.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.82. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 12

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.34E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.73E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.75E-05	Arsenic Chromium	94.2 5.8	Ingestion Inhalation Dermal External Exposure	72.8 5.8 21.4	<1	Arsenic	71.9	Ingestion Inhalation Dermal	79.6 4.1 16.3

Table D8.82. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 12 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	4.54E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	4.54E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.83. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 13

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.18E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.61E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.33E-05	Arsenic Chromium	94.5 5.5	Ingestion Inhalation Dermal External Exposure	73.0 5.6 21.4	<1	Arsenic	86.5	Ingestion Inhalation Dermal	79.6 0.8 19.6

Table D8.83. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 13 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	4.23E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	4.23E-06	Chromium	99.7	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.84. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 14

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.98E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.46E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.61E-05	Arsenic Chromium	94.4 5.6	Ingestion Inhalation Dermal External Exposure	72.9 5.7 21.4	<1	Arsenic	61.4	Ingestion Inhalation Dermal	85.6 0.5 13.9

Table D8.84. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 14 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.84E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.84E-06	Chromium	99.6	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.85. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 15

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.60E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.18E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	2.56E-05	Arsenic Cesium-137 Chromium	86.0 8.8 5.1	Ingestion Inhalation Dermal External Exposure	66.6 5.2 19.5 8.7	<1	Arsenic	99.9	Ingestion Inhalation Dermal	77.0 0.4 22.6

Table D8.85. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 15 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	3.10E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	3.10E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.86. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 16

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.48E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	1.10E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - subsurface	3.84E-06	Cesium-137 Chromium	66.5 33.4	Ingestion Inhalation Dermal External Exposure	0.7 33.5 65.7	<1	*no COCs			

Table D8.86. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 16 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.88E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.88E-06	Chromium	99.4	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.87. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 17

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.38E-05	Chromium PCB, Total Total PAH Uranium-238	19.7 28.6 38.7 10.6	Ingestion Inhalation Dermal External Exposure	6.0 21.9 60.3 11.7	<1	*no COCs			
Outdoor Worker - surface	1.55E-05	Chromium PCB, Total Total PAH Uranium-238	13.0 29.4 42.0 13.6	Ingestion Inhalation Dermal External Exposure	38.1 14.4 39.8 7.7	<1	*no COCs			
Outdoor Worker - subsurface	3.47E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	65.0 4.8 13.1 12.2 4.3	Ingestion Inhalation Dermal External Exposure	63.3 5.5 28.8 2.5	<1	Arsenic	48.9	Ingestion Inhalation Dermal	85.7 3.3 11.1

Table D8.87. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 195, EU 17 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.20E-05	Chromium	12.6	Ingestion	15.7	<1	*no COCs			
		PCB, Total	27.6	Inhalation	14.0					
		Total PAH	38.7	Dermal	50.9					
		Uranium-235	4.0	External Exposure	19.4					
		Uranium-238	17.1							
Future Child Resident - surface	4.20E-05	Chromium	12.6	Ingestion	15.7	<1	*no COCs			
		PCB, Total	27.6	Inhalation	14.0					
		Total PAH	38.7	Dermal	50.9					
		Uranium-235	4.0	External Exposure	19.4					
		Uranium-238	17.1							
Future Teen Recreational User - surface	6.85E-06	PCB, Total	36.2	Ingestion	2.0	<1	*no COCs			
		Total PAH	51.3	Inhalation	8.1					
				Dermal	84.9					
				External Exposure	5.0					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.88. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 486

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.11E-06	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			
Future Industrial Worker - surface	1.99E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			
Outdoor Worker - surface	1.48E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	1.1 0.0 98.9	<1	*no COCs			
Outdoor Worker - subsurface	1.48E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	1.1 0.0 98.9	<1	*no COCs			

Table D8.88. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 486 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.00E-04	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			
Future Child Resident - surface	1.00E-04	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			
Future Teen Recreational User - surface	4.17E-06	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.89. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 487

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.60E-05	Cesium-137	100.0	Ingestion	0.1	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.9					
Outdoor Worker - surface	1.20E-05	Cesium-137	100.0	Ingestion	1.1	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	98.9					
Outdoor Worker - subsurface	1.20E-05	Cesium-137	100.0	Ingestion	1.1	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	98.9					

Table D8.89. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 487 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.07E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			
Future Child Resident - surface	8.07E-05	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			
Future Teen Recreational User - surface	3.36E-06	Cesium-137	100.0	Ingestion Inhalation Dermal External Exposure	0.1 0.0 99.9	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8-90. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 492

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.96E-05	Chromium	6.5	Ingestion	9.0	<1	*no COCs			
		PCB, Total	44.5	Inhalation	9.9					
		Uranium-238	42.7	Dermal	40.5					
				External Exposure	40.7					
Future Industrial Worker - surface	5.28E-04	Arsenic	2.8	Ingestion	9.0	<1	Uranium	73.2	Ingestion Inhalation Dermal	79.7 2.1 18.2
		Chromium	6.5	Inhalation	9.9					
		PCB, Total	44.5	Dermal	40.5					
		Uranium-234	0.5	External Exposure	40.7					
		Uranium-235	2.7							
		Uranium-238	42.7							
Outdoor Worker - surface	6.92E-04	Arsenic	5.1	Ingestion	48.6	2.34	Arsenic Uranium	9.4 87.7	Ingestion Inhalation Dermal	97.4 0.3 2.3
		Chromium	3.7	Inhalation	5.6					
		PCB, Total	39.3	Dermal	22.8					
		Uranium-234	2.8	External Exposure	23.0					
		Uranium-235	1.8							
		Uranium-238	47.2							
Outdoor Worker - subsurface	6.95E-04	Arsenic	5.1	Ingestion	48.4	2.34	Arsenic Uranium	9.4 87.7	Ingestion Inhalation Dermal	97.4 0.3 2.3
		Cesium-137	0.4	Inhalation	5.5					
		Chromium	3.7	Dermal	22.7					
		PCB, Total	39.1	External Exposure	23.3					
		Uranium-234	2.7							
		Uranium-235	1.8							
Uranium-238	47.0									

Table D8.90. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 492 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	8.69E-06	PCB, Total Uranium-238	39.1 47.0	See Outdoor Worker (subsurface)	<1	<1	Uranium	87.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.02E-03	Arsenic Chromium Cobalt-60 Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	3.1 3.3 0.1 0.2 34.2 0.6 3.6 54.9	Ingestion Inhalation Dermal External Exposure	14.2 5.0 27.2 53.7	1.03	Arsenic Uranium	17.7 78.9	Ingestion Inhalation Dermal	87.2 0.8 12.1
Future Child Resident - surface	2.02E-03	Arsenic Chromium Cobalt-60 Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	3.1 3.3 0.1 0.2 34.2 0.6 3.6 54.9	Ingestion Inhalation Dermal External Exposure	14.2 5.0 27.2 53.7	8.72	Arsenic Uranium Vanadium	10.3 86.8 1.3	Ingestion Inhalation Dermal	96.3 0.4 3.3
Future Teen Recreational User - surface	2.10E-04	Arsenic Chromium PCB, Total Uranium-235 Uranium-238	3.9 3.0 70.1 1.4 21.3	Ingestion Inhalation Dermal External Exposure	3.2 4.5 70.9 21.4	<1	Arsenic Uranium	46.5 48.3	Ingestion Inhalation Dermal	52.6 1.4 46.0

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8-91. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 493

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.70E-05	Chromium PCB, Total Total PAH Uranium-238	12.8 8.1 49.5 19.0	Ingestion Inhalation Dermal External Exposure	6.5 14.5 52.7 26.3	<1	*no COCs			
Outdoor Worker - surface	1.96E-05	Chromium PCB, Total Total PAH Uranium-238	8.3 8.2 52.5 23.9	Ingestion Inhalation Dermal External Exposure	39.9 9.3 33.9 16.9	<1	Cobalt Manganese	61.5 20.2	Ingestion Inhalation Dermal	90.6 9.4
Outdoor Worker - subsurface	5.06E-05	Arsenic Cesium-137 Chromium PCB, Total Total PAH Uranium-238	56.2 5.0 3.2 3.2 20.4 9.3	Ingestion Inhalation Dermal External Exposure	59.0 3.6 25.9 11.5	<1	Arsenic Cobalt Manganese	19.1 47.8 15.7	Ingestion Inhalation Dermal	88.3 7.4 4.3

Table D8.91. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 493 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1	Cobalt	47.8	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.85E-05	Chromium	7.3	Ingestion	<1	Cobalt Manganese	52.2 31.4	Ingestion	75.0
		Cobalt-60	6.6	Inhalation				Inhalation	25.0
		Neptunium-237	3.9	Dermal				Dermal	
		PCB, Total	7.0	External Exposure					
		Total PAH	44.0						
		Uranium-235	3.6						
Uranium-238	27.2								
Future Child Resident - surface	5.85E-05	Chromium	7.3	Ingestion	2.81	Aluminum Cobalt Manganese Nickel Vanadium	7.0 58.6 23.7 5.3 3.7	Ingestion	85.7
		Cobalt-60	6.6	Inhalation				Inhalation	14.3
		Neptunium-237	3.9	Dermal				Dermal	
		PCB, Total	7.0	External Exposure					
		Total PAH	44.0						
		Uranium-235	3.6						
Uranium-238	27.2								
Future Teen Recreational User - surface	7.84E-06	Total PAH	70.9	Ingestion	<1	*no COCs		Ingestion	
				Inhalation					
				Dermal					
				External Exposure					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8-92. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 517

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.13E-05	Chromium	14.4	Ingestion	4.4	<1	*no COCs			
		Neptunium-237	34.9	Inhalation	16.3					
		PCB, Total	23.6	Dermal	20.3					
		Uranium-238	20.2	External Exposure	59.0					
Outdoor Worker - surface	1.15E-05	Chromium	10.5	Ingestion	30.4	<1	*no COCs			
		Neptunium-237	28.4	Inhalation	11.9					
		PCB, Total	26.8	Dermal	14.8					
		Uranium-238	28.8	External Exposure	42.9					
Outdoor Worker - subsurface	1.15E-05	Chromium	10.5	Ingestion	30.4	<1	*no COCs			
		Neptunium-237	28.4	Inhalation	11.9					
		PCB, Total	26.8	Dermal	14.8					
		Uranium-238	28.8	External Exposure	42.9					

Table D8.92. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 517 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.59E-05	Chromium Cobalt-60 Neptunium-237 PCB, Total Uranium-235 Uranium-238	6.9 4.0 43.1 17.0 4.4 24.5	Ingestion Inhalation Dermal External Exposure	6.2 7.8 12.8 73.2	<1	*no COCs			
Future Child Resident - surface	4.59E-05	Chromium Cobalt-60 Neptunium-237 PCB, Total Uranium-235 Uranium-238	6.9 4.0 43.1 17.0 4.4 24.5	Ingestion Inhalation Dermal External Exposure	6.2 7.8 12.8 73.2	<1	Nickel	95.7	Ingestion Inhalation Dermal	92.5 7.5
Future Teen Recreational User - surface	3.41E-06	PCB, Total	49.0	Ingestion Inhalation Dermal External Exposure	2.0 9.9 47.1 41.1	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.93. Summary of Risk Characterization Adjusted for Dermal Absorption for AOC 541

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI							
Current Industrial Worker - surface	5.85E-05	Chromium	2.6	Ingestion	9.4	<1	*no COCs										
		PCB, Total	30.9	Inhalation	5.1												
		Total PAH	3.8	Dermal	30.2												
		Uranium-235	4.3	External	55.3												
		Uranium-238	56.4	Exposure													
		Americium-241	0.1	Ingestion	9.4						1.1	Uranium	96.5	Ingestion	96.5		
		Cesium-137	1.1	Inhalation	5.1										Inhalation	3.2	
		Chromium	2.6	Dermal	30.2										Dermal	0.3	
		PCB, Total	30.9	External	55.3												
		Total PAH	3.8	Exposure													
Uranium-234	0.7																
Uranium-235	4.3																
Uranium-238	56.4																
Outdoor Worker - surface	1.40E-03	Americium-241	0.3	Ingestion	50	7.59	Uranium				99.6						
		Cesium-137	0.6	Inhalation	2.8												
		Chromium	1.4	Dermal	16.7												
		PCB, Total	26.7	External	30.6												
		Total PAH	3.4	Exposure													
		Uranium-234	3.6														
		Uranium-235	2.8														
		Uranium-238	61.1														
		Americium-241	0.3	Ingestion	50.2							8.94	99.2				
		Arsenic	1.4	Inhalation	2.7												
Cesium-137	0.5	Dermal	16.2														
Chromium	1.5	External	30.9														
PCB, Total	24.5	Exposure															
Total PAH	4.2																
Uranium-234	3.3																
Uranium-235	3.2																
Uranium-238	61.0																
Outdoor Worker - subsurface	1.55E-03	Americium-241	0.3	Ingestion	50.2	8.94	Arsenic Uranium				99.2						
		Arsenic	1.4	Inhalation	2.7												
		Cesium-137	0.5	Dermal	16.2												
		Chromium	1.5	External	30.9												
		PCB, Total	24.5	Exposure													
		Total PAH	4.2														
		Uranium-234	3.3														
		Uranium-235	3.2														
		Uranium-238	61.0														
		Americium-241	0.3	Ingestion	50.2							8.94	99.2				
Arsenic	1.4	Inhalation	2.7														
Cesium-137	0.5	Dermal	16.2														
Chromium	1.5	External	30.9														
PCB, Total	24.5	Exposure															
Total PAH	4.2																
Uranium-234	3.3																
Uranium-235	3.2																
Uranium-238	61.0																

Table D8.93. Summary of Risk Characterization Adjusted for Dermal Absorption for AOC 541 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.94E-05	PCB, Total	24.5	See Outdoor Worker (subsurface)	2.79	Uranium	96.0	See Outdoor Worker (subsurface) for %	98.7	
		Uranium-238	61.0							
		Americium-241	0.2	Ingestion	11.9	3.02	Uranium	97.3	Ingestion	98.7
		Cesium-137	1.3	Inhalation	2.3				Inhalation	1.1
		Chromium	1.2	Dermal	18.6				Dermal	0.2
		Cobalt-60	0.1	External	67.1					
		Neptunium-237	0.0	Exposure						
		PCB, Total	21.9							
		Total PAH	2.8							
		Uranium-234	0.7							
Future Adult Resident - surface	4.34E-03	Uranium-235	5.1							
		Uranium-238	66.7							
		Arsenic	28.8	Ingestion	11.9	27.98	Aluminum	0.7	Ingestion	99.4
		Cesium-137	21.7	Inhalation	2.3		Iron	1.0	Inhalation	0.6
		Chromium	0.3	Dermal	18.6		Uranium	97.6	Dermal	0.0
		Naphthalene	0.2	External	67.1					
		Neptunium-237	0.8	Exposure						
		PCB, Total	13.8							
		Plutonium-239/240	0.1							
		Thorium-230	0.2							
Future Child Resident - surface	4.34E-03	Total PAH	10.3							
		Uranium-234	1.3							
		Uranium-235	2.8							
		Uranium-238	19.8							
		Arsenic	35.0	Ingestion	3.5	<1	Uranium	95.6	Ingestion	95.6
		Cesium-137	8.3	Inhalation	2.6				Inhalation	3.2
		PCB, Total	27.0	Dermal	60.5				Dermal	1.2
		Total PAH	20.3	External	33.4					
		Uranium-235	1.1	Exposure						
		Uranium-238	7.3							
Future Teen Recreational User - surface	3.64E-04	PCB, Total	27.0							
		Total PAH	20.3	External	33.4					
		Uranium-235	1.1	Exposure						
		Uranium-238	7.3							
		Arsenic	35.0	Ingestion	3.5	<1	Uranium	95.6	Ingestion	95.6
		Cesium-137	8.3	Inhalation	2.6				Inhalation	3.2
		PCB, Total	27.0	Dermal	60.5				Dermal	1.2
		Total PAH	20.3	External	33.4					
		Uranium-235	1.1	Exposure						
		Uranium-238	7.3							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.94. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 561, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	5.73E-06	Uranium-238	61.2	Ingestion	12.4	<1	*no COCs				
				Inhalation	3.5						
				Dermal	22.6						
				External Exposure	61.5						
			1.02E-04	Arsenic	16.2	Ingestion	12.4	<1	Arsenic	45.1	49.7
				Chromium	2.8	Inhalation	3.5				17.3
Future Industrial Worker - surface		Cobalt-60	3.9	Dermal	22.6					32.9	
		PCB, Total	5.4	External Exposure	61.5						
		Total PAH	6.5	Exposure							
		Uranium-235	3.4								
		Uranium-238	61.2								
			1.56E-04	Arsenic	25.5	Ingestion	57.5	<1	Arsenic	27.6	90.5
Outdoor Worker - surface		Chromium	1.3	Inhalation	1.7					3.3	
		Cobalt-60	1.9	Dermal	11					6.2	
		PCB, Total	4.1	External Exposure	29.8						
		Total PAH	5.2	Exposure							
		Uranium-234	1.8								
		Uranium-235	1.9								
		Uranium-238	58.1								
Outdoor Worker - subsurface	1.70E-04	Arsenic	23.1	Ingestion	56.1	<1				90.7	
		Cesium-137	1.3	Inhalation	1.6					3.7	
		Chromium	1.3	Dermal	12.5					5.7	
		Cobalt-60	1.7	External Exposure	29.8						
		PCB, Total	3.6	Exposure							
		Total PAH	9.4								
		Uranium-234	1.8								
		Uranium-235	1.8								
		Uranium-238	55.9								

Table D8.94. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 561, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.13E-06	Uranium-238	24.5	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.60E-04	Arsenic	15.3	Ingestion	16.7	<1	Arsenic	42.2	Ingestion	65.9
		Chromium	1.2	Inhalation	1.5		Uranium	24.9	Inhalation	7.6
		Cobalt-60	4.4	Dermal	12.9				Dermal	26.5
		PCB, Total	3.5	External	69.0					
		Total PAH	4.4	Exposure						
		Uranium-234	0.4							
Uranium-235	3.8									
Uranium-238	66.9									
Future Child Resident - surface	4.60E-04	Arsenic	15.3	Ingestion	16.7	3.47	Arsenic	29.0	Ingestion	86.5
		Chromium	1.2	Inhalation	1.5		Cobalt	13.4	Inhalation	5.0
		Cobalt-60	4.4	Dermal	12.9		Iron	10.8	Dermal	8.5
		PCB, Total	3.5	External	69.0		Manganese	8.7		
		Total PAH	4.4	Exposure			Uranium	32.6		
		Uranium-234	0.4							
Uranium-235	3.8									
Uranium-238	66.9									
Future Teen Recreational User - surface	3.18E-05	Arsenic	29.4	Ingestion	5.6	<1	Arsenic	76.1	Ingestion	25.7
		PCB, Total	11.0	Inhalation	2.0				Inhalation	9.0
		Total PAH	13.8	Dermal	50.9				Dermal	65.3
		Uranium-238	39.1	External	41.6					
				Exposure						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.95. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 561, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	2.31E-05	PCB, Total	21.2	Ingestion	9.9	<1	*no COCs			
		Total PAH	9.9	Inhalation	4.1					
		Uranium-235	4.3	Dermal	29.8					
		Uranium-238	57	External Exposure	56.3					
		Arsenic	3.2	Ingestion	9.9					
Future Industrial Worker - surface	4.13E-04	Cesium-137	1.1	Inhalation	4.1	<1	Uranium	61.4	Ingestion Inhalation Dermal	75.1 8.7 16.1
		Chromium	2.3	Dermal	29.8					
		Cobalt-60	0.4	External Exposure	56.3					
		PCB, Total	21.2	Exposure						
		Total PAH	9.9							
Outdoor Worker - surface	5.66E-04	Uranium-234	0.5			2.07	Arsenic Cobalt Uranium	9.4 6.4 77.5	Ingestion Inhalation Dermal	96.7 1.2 2.2
		Uranium-235	4.3							
		Uranium-238	57							
		Arsenic	5.5	Ingestion	51.3					
		Cesium-137	0.6	Inhalation	2.2					
		Chromium	1.2	Dermal	16.1					
		Cobalt-60	0.2	External Exposure	30.4					
		PCB, Total	17.9	Exposure						
		Total PAH	8.9							
		Uranium-234	2.5							
Outdoor Worker - subsurface	5.51E-04	Uranium-235	2.8			2.11	Arsenic Cobalt Uranium	9.0 6.0 77.2	Ingestion Inhalation Dermal	96.8 1.2 2.1
		Uranium-238	60.3							
		Arsenic	5.5	Ingestion	51.2					
		Cesium-137	0.6	Inhalation	2.3					
		Chromium	1.4	Dermal	16.4					
		Cobalt-60	0.2	External Exposure	30.1					
		PCB, Total	18.7	Exposure						
		Total PAH	8.6							
		Uranium-234	2.5							
		Uranium-235	2.7							
Uranium-238	59.7									

Table D8.95. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 561, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	6.89E-06	PCB, Total	18.7	See Outdoor Worker (subsurface)	<1	Uranium	77.2	See Outdoor Worker (subsurface) for %		
		Uranium-238	59.7							
Future Adult Resident - surface	1.74E-03	Arsenic	3.2	Ingestion	12.9	Uranium	17.5	85.5	Ingestion	
		Cesium-137	1.4	Inhalation	1.8					
		Chromium	1.1	Dermal	18.1					
		Cobalt-60	0.5	External	67.2					
		PCB, Total	14.7	Exposure						
		Total PAH	7.2							
		Uranium-234	0.5							
Uranium-235	5.2									
Uranium-238	66.3									
Future Child Resident - surface	1.74E-03	Arsenic	3.2	Ingestion	12.9	Antimony Arsenic Cobalt Manganese Uranium	7.75	95.1	Ingestion	
		Chromium	1.4	Inhalation	1.8					
		Cobalt-60	1.1	Dermal	18.1					
		PCB, Total	0.5	External	67.2					
		Total PAH	14.7	Exposure						
		Uranium-234	7.2							
		Uranium-235	0.5							
Uranium-238	5.2									
Uranium-238	66.3									
Future Teen Recreational User - surface	1.43E-04	Arsenic	5.1	Ingestion	3.8	*no COCs	<1			
		Chromium	1.2	Inhalation	2.1					
		PCB, Total	38.4	Dermal	60					
		Total PAH	18.9	External	34.1					
		Uranium-235	2.6	Exposure						
		Uranium-238	32.7							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.96. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.61E-06	Uranium-238	100.0	Ingestion	11.2	<1	*no COCs			
				Inhalation	0.3					
				Dermal External Exposure	88.5					
Outdoor Worker - surface	2.33E-06	Uranium-238	100.0	Ingestion	54.7	<1	Uranium	100.0	Ingestion	99.8
				Inhalation	0.2				Inhalation	0.2
				Dermal External Exposure	45.2				Dermal	
Outdoor Worker - subsurface	9.15E-05	Arsenic Cesium-137 Chromium PCB, Total Uranium-235 Uranium-238	31.1 4.3 8.4 13.6 1.4 41.2	Ingestion	52.3	<1	Arsenic Uranium	40.2 59.6	Ingestion	90.6
				Inhalation	9.1				Inhalation	0.3
				Dermal External Exposure	14.5				Dermal	9.1
					24.0					

Table D8.96. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.14E-06			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.89E-06	Uranium-238	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	7.89E-06	Uranium-238	100.0	Ingestion Inhalation Dermal External Exposure	<1	Uranium	100.0	Ingestion Inhalation Dermal	99.6 0.4
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.97. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 2

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI
Current Industrial Worker - surface	2.10E-05	Uranium-235	6.0	Ingestion	11.1	<1	*no COCs	<1		
		Uranium-238	91.0	Inhalation	0.5					
				Dermal	1.9					
				External Exposure	86.5					
Future Industrial Worker - surface	3.76E-04	PCB, Total	2.2	Ingestion	11.1	<1	*no COCs	<1		
		Uranium-234	0.8	Inhalation	0.5					
		Uranium-235	6.0	Dermal	1.9					
		Uranium-238	91.0	External Exposure	86.5					
Outdoor Worker - surface	5.44E-04	PCB, Total	1.8	Ingestion	54.6	<1	*no COCs	<1		
		Uranium-234	3.5	Inhalation	0.2					
		Uranium-235	3.6	Dermal	1.0					
		Uranium-238	91.1	External Exposure	44.2					
Outdoor Worker - subsurface	5.47E-04	Cesium-137	0.6	Ingestion	54.3	<1	*no COCs	<1		
		PCB, Total	1.8	Inhalation	0.2					
		Uranium-234	3.4	Dermal	1.0					
		Uranium-235	3.6	External Exposure	44.5					
Uranium-238	90.6									

Table D8.97. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 2 (Continued)

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR (subsurface)	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI (subsurface) for %
Excavation Worker - subsurface	6.84E-06	Uranium-238	90.6	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.83E-03	PCB, Total	1.4	Ingestion	9.4	<1	*no COCs			
		Uranium-234	0.6	Inhalation	0.1					
		Uranium-235	6.2	Dermal	1.0					
		Uranium-238	91.8	External Exposure	89.5					
Future Child Resident - surface	1.83E-03	PCB, Total	1.4	Ingestion	9.4	<1	*no COCs			
		Uranium-234	0.6	Inhalation	0.1					
		Uranium-235	6.2	Dermal	1.0					
		Uranium-238	91.8	External Exposure	89.5					
Future Teen Recreational User - surface	7.82E-05	PCB, Total	6.8	Ingestion	6.0	<1	*no COCs			
		Uranium-235	6.0	Inhalation	0.3					
		Uranium-238	86.8	Dermal External Exposure	6.5 87.2					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.98. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.31E-05	Chromium PCB, Total Total PAH Uranium-238	9.7	Ingestion	8.3	<1	*no COCs			
			9.8	Inhalation	10.6					
			28.4	Dermal	34.7					
			49.0	External Exposure	46.5					
Outdoor Worker - surface	1.66E-05	PCB, Total Total PAH Uranium-238	8.9	Ingestion	46.6	<1	*no COCs			
			27.3	Inhalation	6.2					
			56.0	Dermal	20.2					
				External Exposure	27.1					
Outdoor Worker - subsurface	1.57E-05	PCB, Total Total PAH Uranium-238	9.4	Ingestion	49.3	<1	*no COCs			
			28.9	Inhalation	0.6					
			59.3	Dermal	21.4					
				External Exposure	28.7					

Table D8.98. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	5.11E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	4.8 7.4 22.1 4.1 61.6	Ingestion Inhalation Dermal External Exposure	12.1 5.2 22.7 59.9	<1	*no COCs			
Future Child Resident - surface	5.11E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	4.8 7.4 22.1 4.1 61.6	Ingestion Inhalation Dermal External Exposure	12.1 5.2 22.7 59.9	<1	Uranium	99.9	Ingestion Inhalation Dermal	99.6 0.4
Future Teen Recreational User - surface	4.84E-06	Total PAH Uranium-238	50.6 26.3	Ingestion Inhalation Dermal External Exposure	3.0 5.2 65.4 26.4	<1	*no COCs			

There are no subsurface data available for assessment.

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.99. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	2.86E-06	Chromium Uranium-238	54.0	Ingestion	5.1	<1	*no COCs			
			46.0	Inhalation	54.1					
				Dermal External Exposure	40.7					
Outdoor Worker - surface	3.05E-06	Chromium Uranium-238	37.5	Ingestion	34.2	<1	*no COCs			
			62.5	Inhalation	37.6					
				Dermal External Exposure	28.2					
Outdoor Worker - subsurface	7.47E-06	Cesium-137 Chromium Uranium-238	57.0	Ingestion	15.7	<1	*no COCs			
			15.3	Inhalation	15.4					
			27.6	Dermal External Exposure	68.9					

Table D8.99. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	9.48E-06	Chromium Uranium-238	31.7 68.3	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	9.48E-06	Chromium Uranium-238	31.7 68.3	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.100. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 5

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI	
Current Industrial Worker - surface	2.85E-06	Uranium-238	72.1	Ingestion	9.8	<1	*no COCs				
				Inhalation	11.0						
				Dermal	10.7						
				External Exposure	68.5						
Future Industrial Worker - surface	5.09E-05	Chromium PCB, Total Total PAH Uranium-235 Uranium-238	10.0	Ingestion	9.8	<1	*no COCs				
			9.9	Inhalation	11.0						
			2.3	Dermal	10.7						
			4.7	External Exposure	68.5						
Outdoor Worker - surface	6.94E-05	Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	5.4	Ingestion	51.1	<1	Uranium			Ingestion Inhalation Dermal	99.8 0.2
			8.4	Inhalation	5.9						
			2.1	Dermal	5.8						
			4.4	External Exposure	37.2						
			3.0	External Exposure	37.2						
76.7											
Outdoor Worker - subsurface	7.27E-05	Cesium-137 Chromium PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	4.5	Ingestion	48.8	<1	Uranium			Ingestion Inhalation Dermal	99.8 0.2
			5.2	Inhalation	5.7						
			8.1	Dermal	5.6						
			2.0	External Exposure	40.0						
			4.2	External Exposure	40.0						
			2.9	External Exposure	40.0						
73.2											

Table D8.100. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 5 (Continued)

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI		
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %			
Future Adult Resident - surface	2.23E-04	Chromium	4.4	Ingestion	10.0	<1	*no COCs					
		PCB, Total	6.7	Inhalation	4.8							
		Total PAH	1.6	Dermal	6.3							
		Uranium-234	0.8	External	78.9							
		Uranium-235	5.4	Exposure								
Uranium-238	81.0											
Future Child Resident - surface	2.23E-04	Chromium	4.4	Ingestion	10.0	<1	Uranium	99.9	Ingestion	99.6		
		PCB, Total	6.7	Inhalation	4.8						Inhalation	0.4
		Total PAH	1.6	Dermal	6.3							
		Uranium-234	0.8	External	78.9							
		Uranium-235	5.4	Exposure								
Uranium-238	81.0											
Future Teen Recreational User - surface	1.27E-05	PCB, Total	25.0	Ingestion	4.6	<1	*no COCs					
		Uranium-238	57.3	Inhalation	7.9							
				Dermal	30.0							
				External	57.5							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.101. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 6

Receptor	Total ELCR	COCs	% Total ELCR	Routes of Exposure	% Total ELCR	Total HI	COCs	% Total HI	Routes of Exposure	% Total HI
Current Industrial Worker - surface	1.30E-05	Uranium-238	91.7	Ingestion	11.2	<1	*no COCs	<1		
				Inhalation	0.3					
				Dermal	88.4					
Future Industrial Worker - surface	2.32E-04	Uranium-234 Uranium-235 Uranium-238	0.9	Ingestion	11.2	<1	*no COCs	<1		
				Inhalation	0.3					
				Dermal	88.4					
Outdoor Worker - surface	3.38E-04	Uranium-234 Uranium-235 Uranium-238	4.2	Ingestion	54.8	<1	*no COCs	<1		
				Inhalation	0.2					
				Dermal	45.0					
Outdoor Worker - subsurface	3.38E-04	Uranium-234 Uranium-235 Uranium-238	4.2	Ingestion	54.8	<1	*no COCs	<1		
				Inhalation	0.2					
				Dermal	45.0					

Table D8.101. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 562, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	4.22E-06	Uranium-238	91.4	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.14E-03	Uranium-234	0.7	Ingestion	9.2	<1	*no COCs			
		Uranium-235	7.6	Inhalation	0.1					
		Uranium-238	91.7	Dermal						
Future Child Resident - surface	1.14E-03	Uranium-234	0.7	Ingestion	9.2	<1	*no COCs			
		Uranium-235	7.6	Inhalation	0.1					
		Uranium-238	91.7	Dermal						
Future Teen Recreational User - surface	4.61E-05	Uranium-235	7.8	Ingestion	6.3	<1	*no COCs			
		Uranium-238	91.7	Inhalation	0.2					
				Dermal						
				External Exposure	90.7					
				External Exposure	93.5					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.102. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 563, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.50E-05	Chromium PCB, Total Uranium-238	62.9 26.3 10.8	Ingestion Inhalation Dermal External Exposure	2.9 64.8 22.7 9.6	<1	*no COCs			
Outdoor Worker - surface	1.39E-05	Chromium PCB, Total Uranium-238	50.3 32.8 16.9	Ingestion Inhalation Dermal External Exposure	22.5 51.8 18.1 7.6	<1	*no COCs			
Outdoor Worker - subsurface	3.54E-05	Cesium-137 Chromium PCB, Total Uranium-238	7.1 23.1 61.7 7.1	Ingestion Inhalation Dermal External Exposure	28.9 26.0 34.0 11.1	<1	*no COCs			

Table D8.102. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 563, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.79E-05	Chromium PCB, Total Uranium-238	48.4 30.6 21.0	Ingestion Inhalation Dermal External Exposure	8.0 49.8 23.0 19.1	<1	*no COCs			
Future Child Resident - surface	3.79E-05	Chromium PCB, Total Uranium-238	48.4 30.6 21.0	Ingestion Inhalation Dermal External Exposure	8.0 49.8 23.0 19.1	<1	*no COCs			
Future Teen Recreational User - surface	4.52E-06	Chromium PCB, Total	38.1 54.8	Ingestion Inhalation Dermal External Exposure	1.5 39.3 52.6 6.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.103. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 563, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	8.39E-06	Cesium-137	89.6	Ingestion	1.3	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	98.7					
Outdoor Worker - surface	6.89E-06	Cesium-137 Uranium-238	81.5 18.5	Ingestion	11.0	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	89.0					
Outdoor Worker - subsurface	6.89E-06	Cesium-137 Uranium-238	81.5 18.5	Ingestion	11.0	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	89.0					

Table D8.103. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 563, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.22E-05	Cesium-137 Uranium-238	89.8 10.2	Ingestion	1.0	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.0					
Future Child Resident - surface	4.22E-05	Cesium-137 Uranium-238	89.8 10.2	Ingestion	1.0	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.0					
Future Teen Recreational User - surface	1.75E-06	Cesium-137	90.1	Ingestion	0.7	<1	*no COCs			
				Inhalation	0.0					
				Dermal External Exposure	99.3					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.104. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 564

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	3.90E-06	Arsenic	61.9	Ingestion	18.9	<1	*no COCs				
				Inhalation	4.8						
Future Industrial Worker - surface	6.97E-05	Arsenic Cesium-137 Chromium PCB, Total Uranium-238	61.9 10.3 3.6 14.8 7.0	External Exposure	18.0	<1	Arsenic	80.8		Ingestion	38.8
				Ingestion	18.9					Inhalation	1.2
				Inhalation	4.8					Dermal	60.1
				Dermal	58.3						
Outdoor Worker - surface	1.35E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-238	76.5 4.0 1.4 8.8 1.7 1.8 5.2	Ingestion	69.1	1.08	Arsenic Iron Thallium	60.2 16.9 9.5		Ingestion	85.9
				Inhalation	1.8					Inhalation	0.3
				Dermal	22.2					Dermal	13.9
				External Exposure	6.8						
Outdoor Worker - subsurface	1.36E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-238	76.3 4.0 1.5 8.8 1.7 1.8 5.4	Ingestion	69.0	1.12	Arsenic Iron Thallium	57.7 16.2 9.1		Ingestion	86.3
				Inhalation	2.0					Inhalation	0.4
				Dermal	22.2					Dermal	13.3
				External Exposure	6.9						

Table D8.104. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 564 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.70E-06	Arsenic	76.3	See Outdoor Worker (subsurface)	<1	Arsenic	57.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.86E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-235 Uranium-238	63.9 12.7 1.7 10.6 0.5 0.5 1.7 8.4	Ingestion Inhalation Dermal External Exposure	<1	Arsenic	75.4	Ingestion Inhalation Dermal	51.3 0.5 48.2
Future Child Resident - surface	2.86E-04	Arsenic Cesium-137 Chromium PCB, Total Thorium-230 Uranium-234 Uranium-235 Uranium-238	63.9 12.7 1.7 10.6 0.5 0.5 1.7 8.4	Ingestion Inhalation Dermal External Exposure	4.20	Arsenic Iron Thallium Uranium Vanadium	62.3 15.9 9.0 5.9 4.9	Ingestion Inhalation Dermal	80.9 0.4 18.7
Future Teen Recreational User - surface	3.39E-05	Arsenic Cesium-137 PCB, Total	71.5 4.5 19.0	Ingestion Inhalation Dermal External Exposure	<1	Arsenic	91.8	Ingestion Inhalation Dermal	14.4 0.4 85.2

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.105. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface	<1E-6					<1	*no COCs			

Table D8.105. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.106. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface		*no COCs					*no COCs			
Future Industrial Worker - surface		*no COCs					*no COCs			
Outdoor Worker - surface		*no COCs					*no COCs			
Outdoor Worker - subsurface							*no COCs			

Table D8.106. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface				See Outdoor Worker (subsurface)				See Outdoor Worker (subsurface)	
Future Adult Resident - surface		*no COCs				*no COCs			
Future Child Resident - surface		*no COCs				*no COCs			
Future Teen Recreational User - surface		*no COCs				*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.107. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.26E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	100.0	<1	*no COCs			
Outdoor Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.74E-06	Chromium Uranium-238	46.6 53.4	Ingestion Inhalation Dermal External Exposure	29.2 46.6 24.1	<1	*no COCs			

Table D8.107. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)	<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.44E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Child Resident - surface	2.44E-06	Chromium	100.0	Ingestion Inhalation Dermal External Exposure	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs			<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.108. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.16E-06	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.29E-06	*no COCs				<1	*no COCs			
Outdoor Worker - subsurface	2.72E-05	Arsenic	96.6	Ingestion Inhalation Dermal External Exposure	76.5 0.1 21.9 1.5	<1	Arsenic	78.2	Ingestion Inhalation Dermal	81.0 1.3 17.7

Table D8.108. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 567, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %			
Future Adult Resident - surface	4.08E-06	Chromium Uranium-238	25.7 74.3	Ingestion	6.8	<1	*no COCs	99.9	Ingestion	93.0		
				Inhalation	25.7						Inhalation	7.0
				Dermal External Exposure	67.5							
Future Child Resident - surface	4.08E-06	Chromium Uranium-238	25.7 74.3	Ingestion	6.8	<1	Aluminum	99.9	Ingestion	93.0		
				Inhalation	25.7						Inhalation	7.0
				Dermal External Exposure	67.5							
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.109. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.06E-06	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.90E-05	Arsenic Chromium PCB, Total Technetium-99	58.1 11.1 14.1 5.9	Ingestion Inhalation Dermal External Exposure	22.3 12.4 54.9 10.4	<1	*no COCs			
Outdoor Worker - surface	4.10E-05	Arsenic Chromium PCB, Total Technetium-99 Uranium-238	64.6 3.8 7.5 17.1 3.5	Ingestion Inhalation Dermal External Exposure	73.4 4.2 18.8 3.6	<1	Arsenic	43.5	Ingestion Inhalation Dermal	89.6 0.5 9.8
Outdoor Worker - subsurface	4.71E-05	Arsenic Chromium Cobalt-60 PCB, Total Technetium-99 Uranium-238	57.6 3.4 2.2 6.6 14.9 11.3	Ingestion Inhalation Dermal External Exposure	69.4 3.9 16.7 10.0	<1	Arsenic Iron Nickel Uranium	19.1 23.7 15.3 33.6	Ingestion Inhalation Dermal	93.2 2.5 4.3

Table D8.109. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	7.33E-05	Americium-241	1.6	Ingestion	43.8	<1	Arsenic	61.4	Ingestion	60.3
		Arsenic	63.6	Inhalation	6.2				Inhalation	1.2
		Chromium	5.6	Dermal	36.4				Dermal	38.5
		Neptunium-237	5.4	External Exposure	13.5					
		PCB, Total	10.7							
		Technetium-99	6.4							
Future Child Resident - surface	7.33E-05	Americium-241	1.6	Ingestion	43.8	1.46	Arsenic Iron Uranium	45.7 23.6 21.1	Ingestion	85.7
		Arsenic	63.6	Inhalation	6.2				Inhalation	0.8
		Chromium	5.6	Dermal	36.4				Dermal	13.5
		Neptunium-237	5.4	External Exposure	13.5					
		PCB, Total	10.7							
		Technetium-99	6.4							
Future Teen Recreational User - surface	8.80E-06	Arsenic	70.4	Ingestion	7.8	<1	*no COCs			
		PCB, Total	19.0	Inhalation	4.8					
				Dermal	82.6					
				External Exposure	4.7					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.110. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.79E-06	Uranium-238	48.7	Ingestion	15	<1	*no COCs			
				Inhalation	4					
				Dermal	26.3					
				External	54.7					
				Exposure						
Future Industrial Worker - surface	6.77E-05	Arsenic	21.5	Ingestion	15	<1	*no COCs			
		Chromium	3.3	Inhalation	4					
		Neptunium-237	4.2	Dermal	26.3					
		PCB, Total	3.1	External	54.7					
		Total PAH	8.4	Exposure						
		Uranium-234	2.5							
		Uranium-235	7.5							
Uranium-238	48.7									
Outdoor Worker - surface	1.15E-04	Arsenic	30.5	Ingestion	62.9	<1	Arsenic	22.3	Ingestion	91.7
		Chromium	1.4	Inhalation	1.7		Iron	18.9	Inhalation	3.2
		Neptunium-237	2.0	Dermal	11.5		Nickel	12.7	Dermal	5.1
		PCB, Total	2.1	External	23.9		Uranium	34.8		
		Thorium-230	2.4	Exposure						
		Total PAH	6.1							
		Uranium-234	10.0							
		Uranium-235	3.8							
		Uranium-238	41.7							
Outdoor Worker - subsurface	1.83E-04	Arsenic	19.4	Ingestion	58	1.3	Arsenic	17.0	Ingestion	93.2
		Chromium	1.0	Inhalation	1.9		Iron	16.7	Inhalation	2.8
		Neptunium-237	2.8	Dermal	15.2		Mercury	7.9	Dermal	4.0
		PCB, Total	16.9	External	24.9		Nickel	11.8		
		Thorium-230	1.9	Exposure			Uranium	32.5		
		Total PAH	2.6							
		Uranium-234	9.3							
		Uranium-235	4.1							
Uranium-238	41.9									

Table D8.110. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.28E-06			See Outdoor Worker (subsurface)	<1		Uranium	32.5	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.00E-04	Arsenic	20.6	Ingestion	20.9	<1	Arsenic	35.7	Ingestion	69.8
		Chromium	1.4	Inhalation	1.7		Uranium	26.6	Inhalation	7.8
		Neptunium-237	4.8	Dermal	15.2				Dermal	22.4
		PCB, Total	2.0	External	62.2					
		Thorium-230	0.6	Exposure						
		Total PAH	5.8							
		Uranium-234	2.2							
		Uranium-235	8.5							
Uranium-238	54.1									
Future Child Resident - surface	3.00E-04	Arsenic	20.6	Ingestion	20.9	3.75	Antimony	3.2	Ingestion	88.1
		Chromium	1.4	Inhalation	1.7		Arsenic	23.6	Inhalation	4.9
		Neptunium-237	4.8	Dermal	15.2		Iron	18.1	Dermal	6.9
		PCB, Total	2.0	External	62.2		Manganese	7.2		
		Thorium-230	0.6	Exposure			Nickel	12.5		
		Total PAH	5.8				Uranium	33.5		
		Uranium-234	2.2							
		Uranium-235	8.5							
Uranium-238	54.1									
Future Teen Recreational User - surface	2.21E-05	Arsenic	37.0	Ingestion	6.5	<1	Arsenic	66.1	Ingestion	29.8
		PCB, Total	5.9	Inhalation	2.1				Inhalation	10.0
		Total PAH	17.0	Dermal	56.2				Dermal	60.3
		Uranium-235	4.8	External	35.1					
		Uranium-238	29.6	Exposure						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.111. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.49E-06	PCB, Total	73.9	Ingestion Inhalation Dermal External Exposure	10.5 9.1 79.2 1.3	<1	*no COCs			
Future Industrial Worker - surface	6.23E-05	Arsenic Chromium PCB, Total	20.9 3.7 73.9	Ingestion Inhalation Dermal External Exposure	10.5 9.1 79.2 1.3	<1	*no COCs			
Outdoor Worker - surface	8.76E-05	Arsenic Chromium PCB, Total Uranium-238	35.7 2.0 60.9 1.5	Ingestion Inhalation Dermal External Exposure	52.9 4.8 41.7 0.7	<1	Arsenic Iron Nickel Uranium	22.1 19.6 11.9 28.6	Ingestion Inhalation Dermal	92.3 2.7 5.0
Outdoor Worker - subsurface	1.13E-04	Arsenic Chromium PCB, Total Uranium-234 Uranium-238	40.5 1.5 47.5 1.4 8.1	Ingestion Inhalation Dermal External Exposure	56.3 3.8 35.4 4.4	1.30	Arsenic Cobalt Iron Nickel Uranium	22.0 14.6 17.7 9.3 19.5	Ingestion Inhalation Dermal	92.7 2.3 5.0

Table D8.111. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.42E-06			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.99E-04	Arsenic	27.6	Ingestion	29.0	<1	Arsenic	35.7	Ingestion	71.0
		Chromium	2.3	Inhalation	5.6		Uranium	22.1	Inhalation	6.6
		PCB, Total	67.9	Dermal	63.4				Dermal	22.4
		Uranium-238	2.2	External Exposure	2.0					
Future Child Resident - surface	1.99E-04	Arsenic	27.6	Ingestion	29.0	3.37	Arsenic	23.4	Ingestion	89.0
		Chromium	2.3	Inhalation	5.6		Iron	18.9	Inhalation	4.2
		PCB, Total	67.9	Dermal	63.4		Manganese	5.9	Dermal	6.9
		Uranium-238	2.2	External Exposure	2.0		Mercury	9.5		
							Nickel	11.8		
							Uranium	27.6		
Future Teen Recreational User - surface	3.68E-05	Arsenic PCB, Total	19.9 78.5	Ingestion Inhalation Dermal External Exposure	3.2 2.8 93.5 0.4	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.112. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI				
Current Industrial Worker - surface	1.07E-05	PCB, Total	18.4	Ingestion	12.5	<1	*no COCs							
		Uranium-235	10.6	Inhalation	3.0									
		Uranium-238	51.9	Dermal	23.1									
				External	61.5									
				Exposure										
Future Industrial Worker - surface	1.91E-04	Arsenic	7.0	Ingestion	12.5	<1	*no COCs							
		Chromium	1.2	Inhalation	3.0									
		Neptunium-237	5.2	Dermal	23.1									
		PCB, Total	18.4	External	61.5									
		Total PAH	2.2	Exposure										
Outdoor Worker - surface	2.93E-04	Arsenic	10.9	Ingestion	57.8	1.04	Arsenic	19.2	Ingestion	94.8				
		Chromium	0.6	Inhalation	1.4		Iron				18.5	Inhalation	0.8	
		Neptunium-237	2.8	Dermal	11.1		Nickel				12.8	Dermal	4.3	
		PCB, Total	13.9	External	29.7		Uranium				41.5			
		Thorium-230	1.3	Exposure										
		Total PAH	1.8											
		Uranium-234	13.6											
		Uranium-235	6.0											
		Uranium-238	49.1											
		Outdoor Worker - subsurface	2.49E-04	Arsenic	12.1		Ingestion				56.7	1.36	Arsenic	13.7
Chromium	0.6			Inhalation	1.7	Cobalt	12.6	Inhalation	2.1					
Neptunium-237	2.5			Dermal	15.0	Iron	14.2	Dermal	3.1					
PCB, Total	20.6			External	26.7	Nickel	9.8							
Thorium-230	1.0			Exposure		Uranium	31.7							
Total PAH	1.6													
Uranium-234	12.2													
Uranium-235	5.4													
Uranium-238	44.1													

Table D8.112. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	3.11E-06	Uranium-238	44.1	See Outdoor Worker (subsurface)	<1	<1	Uranium	31.7	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.43E-04	Arsenic	6.7	Ingestion	15.0	<1	Arsenic	32.8	Ingestion	77.3
		Chromium	0.5	Inhalation	1.2		Uranium	34.0	Inhalation	2.1
		Neptunium-237	5.9	Dermal	13.4				Dermal	20.6
		PCB, Total	12.3	External	70.4					
		Thorium-230	0.3	Exposure						
		Total PAH	1.5							
		Uranium-234	2.8							
Future Child Resident - surface	8.43E-04	Arsenic	6.7	Ingestion	15.0	3.92	Antimony	3.5	Ingestion	92.7
		Chromium	0.5	Inhalation	1.2		Arsenic	20.6	Inhalation	1.3
		Neptunium-237	5.9	Dermal	13.4		Copper	2.9	Dermal	6.1
		PCB, Total	12.3	External	70.4		Iron	18.1		
		Thorium-230	0.3	Exposure			Nickel	12.9		
		Total PAH	1.5				Uranium	40.6		
		Uranium-234	2.8							
Future Teen Recreational User - surface	5.96E-05	Arsenic	12.6	Ingestion	5.2	<1	*no COCs			
		Neptunium-237	3.5	Inhalation	1.7					
		PCB, Total	37.1	Dermal	51.7					
		Total PAH	4.7	External	41.5					
		Uranium-235	7.1	Exposure						
		Uranium-238	33.1							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.113. Summary of Risk Characterization for Dermal Absorption for SWMU 14, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	5.40E-06	Uranium-238	57.4	Ingestion	14.6	<1	*no COCs			
				Inhalation	2.5					
				Dermal	16.7					
				External	66.1					
				Exposure						
Future Industrial Worker - surface	9.64E-05	Arsenic	13.6	Ingestion	14.6	<1	*no COCs			
		Chromium	1.6	Inhalation	2.5					
		Neptunium-237	6.7	Dermal	16.7					
		PCB, Total	5.5	External	66.1					
		Thorium-230	1.0	Exposure						
		Total PAH	2.1							
Outdoor Worker - surface	1.61E-04	Uranium-234	2.9			1.18	Arsenic	16.6	Ingestion	94.0
		Uranium-235	8.7				Cobalt	13.9	Inhalation	1.8
		Uranium-238	57.4				Iron	16.5	Dermal	4.2
		Arsenic	19.6	Ingestion	62.1		Mercury	10.7		
		Chromium	0.7	Inhalation	1.1		Uranium	25.7		
		Neptunium-237	3.3	Dermal	7.4					
		PCB, Total	3.8	External	29.3					
		Technetium-99	1.1	Exposure						
		Thorium-230	3.9							
		Total PAH	1.5							
Outdoor Worker - subsurface	1.74E-04	Uranium-234	11.5			1.16	Arsenic	16.3	Ingestion	93.9
		Uranium-235	4.5				Cobalt	11.2	Inhalation	2.1
		Uranium-238	49.9				Iron	16.8	Dermal	4.0
		Arsenic	17.5	Ingestion	56.9		Mercury	10.9		
		Chromium	0.7	Inhalation	2.1		Uranium	26.2		
		Neptunium-237	3.0	Dermal	19.5					
		PCB, Total	27.0	External	21.5					
		Technetium-99	0.8	Exposure						
		Thorium-230	2.8							
		Total PAH	1.1							

Table D8.113. Summary of Risk Characterization for Dermal Absorption for SWMU 14, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	2.18E-06			See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.43E-04	Arsenic	12.5	Ingestion	17.2	<1	Arsenic	28.1	Ingestion	75.6
		Chromium	0.7	Inhalation	1.0		Uranium	20.8	Inhalation	4.6
		Neptunium-237	7.3	Dermal	9.3				Dermal	19.7
		PCB, Total	3.5	External Exposure	72.5					
		Technetium-99	0.3	Exposure						
		Thorium-230	0.9							
		Total PAH	1.4							
		Uranium-234	2.4							
Future Child Resident - surface	4.43E-04	Arsenic	12.5	Ingestion	17.2	4.48	Arsenic	17.8	Ingestion	91.3
		Chromium	0.7	Inhalation	1.0		Cobalt	13.6	Inhalation	2.8
		Neptunium-237	7.3	Dermal	9.3		Iron	16.0	Dermal	5.9
		PCB, Total	3.5	External Exposure	72.5		Manganese	3.5		
		Technetium-99	0.3	Exposure			Mercury	10.4		
		Thorium-230	0.9				Nickel	7.1		
		Total PAH	1.4				Uranium	25.1		
		Uranium-234	2.4							
Future Teen Recreational User - surface	2.69E-05	Arsenic	37.0	Ingestion	6.9	<1	*no COCs			
		PCB, Total	5.9	Inhalation	1.6					
		Total PAH	17.0	Dermal	41.9					
		Uranium-235	4.8	External Exposure	49.7					
		Uranium-238	29.6	Exposure						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.114. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 6

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	4.97E-06	PCB, Total Uranium-238	30.0 33.7	Ingestion	7.9	<1	*no COCs				
				Inhalation	19.1						
Future Industrial Worker - surface	8.87E-05	Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	16.7 11.0 30.0 2.0 6.5 33.7	Dermal	25.9	<1	*no COCs				
				External Exposure	47.1						
				Ingestion	7.9						
				Inhalation	19.1						
				Dermal	25.9						
External Exposure	47.1										
Outdoor Worker - surface	1.10E-04	Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	9.9 7.3 28.0 10.9 4.5 39.3	Ingestion	45.2	<1	Nickel Uranium		19.6 74.7	Ingestion	98.7
				Inhalation	11.4					Inhalation	1.2
				Dermal	15.4					Dermal	0.1
				External Exposure	28.0						
Outdoor Worker - subsurface	1.21E-04	Arsenic Chromium Neptunium-237 PCB, Total Uranium-234 Uranium-235 Uranium-238	20.9 8.9 5.1 25.4 7.5 3.2 28.9	Ingestion	50.8	1.08	Arsenic Nickel Uranium		14.7 16.3 62.1	Ingestion	94.6
				Inhalation	10.2					Inhalation	2.0
				Dermal	18.8					Dermal	3.4
				External Exposure	20.3						

Table D8.114. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 6 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.52E-06			See Outdoor Worker (subsurface)		<1	Uranium	62.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	3.39E-04	Chromium	8.5	Ingestion	10.9	<1	Uranium	72.8	Ingestion	95.7
		Neptunium-237	14.5	Inhalation	9.7				Inhalation	3.6
		PCB, Total	23.1	Dermal	17.4				Dermal	0.7
		Uranium-234	2.1	External Exposure	62.1					
		Uranium-235	8.5							
Uranium-238	43.3									
Future Child Resident - surface	3.39E-04	Chromium	8.5	Ingestion	10.9	3.33	Nickel Uranium	20.0 74.2	Ingestion	98.0
		Neptunium-237	14.5	Inhalation	9.7				Inhalation	1.8
		PCB, Total	23.1	Dermal	17.4				Dermal	0.2
		Uranium-234	2.1	External Exposure	62.1					
		Uranium-235	8.5							
Uranium-238	43.3									
Future Teen Recreational User - surface	2.88E-05	Chromium	9.4	Ingestion	3.2	<1	*no COCs			
		Neptunium-237	7.1	Inhalation	10.7					
		PCB, Total	58.0	Dermal	55.7					
		Uranium-235	4.1	External Exposure	30.4					
		Uranium-238	20.6							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.115. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 7

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	4.27E-06	PCB, Total	53.1	Ingestion	10.3	<1	*no COCs	<1			
				Inhalation	6.9						
Future Industrial Worker - surface	7.63E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-235 Uranium-238	14.9	Ingestion	10.3	<1	*no COCs	<1			
				Inhalation	6.9						
				Dermal	58.1						
				External Exposure	24.8						
Outdoor Worker - surface	1.06E-04	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	25.6	Ingestion	52.4	<1	Arsenic Nickel Uranium	19.1		Ingestion	93.8
				Inhalation	3.7						
				Dermal	30.8						
				External Exposure	13.1						
Outdoor Worker - subsurface	9.90E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-234 Uranium-235 Uranium-238	27.4	Ingestion	52.4	<1	Arsenic Nickel Uranium	18.3		Ingestion	93.1
				Inhalation	3.9						
				Dermal	32.9						
				External Exposure	10.8						

Table D8.115. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 7 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.24E-06			See Outdoor Worker (subsurface)		<1	Uranium	42.0	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.79E-04	Arsenic	17.2	Ingestion	21.4	<1	Arsenic Uranium	31.8 34.6	Ingestion Inhalation Dermal	74.5 3.7 21.9
		Chromium	1.5	Inhalation	3.6					
		Neptunium-237	9.9	Dermal	40.8					
		PCB, Total	42.7	External Exposure	34.2					
		Total PAH	1.2							
Future Child Resident - surface	2.79E-04	Arsenic	17.2	Ingestion	21.4	3.37	Arsenic Mercury Nickel Uranium	20.4 9.9 25.1 42.2	Ingestion Inhalation Dermal	91.2 2.2 6.6
		Chromium	1.5	Inhalation	3.6					
		Neptunium-237	9.9	Dermal	40.8					
		PCB, Total	42.7	External Exposure	34.2					
		Total PAH	1.2							
		Uranium-234	1.0							
		Uranium-235	4.4							
Uranium-238	22.1									
Future Teen Recreational User - surface	3.71E-05	Arsenic	17.2	Ingestion	3.4	<1	*no COCs			
		Neptunium-237	3.1	Inhalation	2.6					
		PCB, Total	68.5	Dermal	83.3					
		Uranium-238	6.7	External Exposure	10.7					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.116. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 8

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI			
Current Industrial Worker - surface	2.69E-06	PCB, Total	55.5	Ingestion	10.9	<1	*no COCs	<1					
				Inhalation	7.3								
Future Industrial Worker - surface	4.80E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-238	23.8	Ingestion	10.9	<1	*no COCs						
				Inhalation	7.3								
				Dermal	67.4								
				External Exposure	14.3								
Outdoor Worker - surface	6.90E-05	Arsenic Chromium Neptunium-237 PCB, Total Total PAH Uranium-238	39.8	Ingestion	54.1	<1	Arsenic Nickel Uranium	21.7	Ingestion	94.1			
				Inhalation	3.8						15.6		
				Dermal	34.7							49.5	
				External Exposure	7.4								
Outdoor Worker - subsurface	6.82E-05	Arsenic Chromium Neptunium-237 PCB, Total Uranium-238	43.1	Ingestion	55.2	<1	Arsenic Mercury Nickel Uranium	20.3	Ingestion	94.5			
				Inhalation	4.0						11.2		
				Dermal	35.4							13.7	
				External Exposure	5.3								52.3

Table D8.116. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 8 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1	Uranium	52.3	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.69E-04	Arsenic	28.5	Ingestion	26.5	<1	Arsenic Uranium	36.3	Ingestion	74.8
		Chromium	1.7	Inhalation	4.1				Inhalation	2.5
		Neptunium-237	9.6	Dermal	49.0				Dermal	22.8
		PCB, Total	46.2	External Exposure	20.4					
		Total PAH	1.9							
		Uranium-235	1.8							
		Uranium-238	10.1							
Future Child Resident - surface	1.69E-04	Arsenic	28.5	Ingestion	26.5	2.97	Arsenic Mercury Nickel Uranium	23.3	Ingestion	91.6
		Chromium	1.7	Inhalation	4.1				Inhalation	1.5
		Neptunium-237	9.6	Dermal	49.0				Dermal	6.8
		PCB, Total	46.2	External Exposure	20.4					
		Total PAH	1.9							
		Uranium-235	1.8							
		Uranium-238	10.1							
Future Teen Recreational User - surface	2.56E-05	Arsenic	25.1	Ingestion	3.6	<1	*no COCs			
		PCB, Total	65.3	Inhalation	2.5					
				Dermal	88.2					
				External Exposure	5.6					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.117. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 9

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	5.57E-05	Neptunium-237	4.1	Ingestion	13.1	<1	*no COCs				
		PCB, Total	3.7	Inhalation	0.9						
		Uranium-234	4.4	Dermal	5.0						
		Uranium-235	13.9	External	81.1						
		Uranium-238	71.0	Exposure							
		Arsenic	1.4	Ingestion	13.1	<1	Uranium	65.3	77.4	Ingestion	
		Cesium-137	0.5	Inhalation	0.9					Inhalation	4.8
		Chromium	0.2	Dermal	5.0					Dermal	17.7
		Neptunium-237	4.1	External	81.1						
		PCB, Total	3.7	Exposure							
Outdoor Worker - surface	1.57E-03	Total PAH	0.8								
		Uranium-234	4.4								
		Uranium-235	13.9								
		Uranium-238	71.0								
		Arsenic	2.2	Ingestion	59.2	2.12	Arsenic	10.0	97.1	Ingestion	
		Cesium-137	0.3	Inhalation	0.4		Nickel	8.1	0.6	Inhalation	
		Chromium	0.1	Dermal	2.3		Uranium	80.2	2.3	Dermal	
		Neptunium-237	2.1	External	38.1						
		PCB, Total	2.7	Exposure							
		Technetium-99	0.2								
Outdoor Worker - subsurface	1.56E-03	Total PAH	0.6								
		Uranium-234	18.8								
		Uranium-235	7.7								
		Uranium-238	65.4								
		Arsenic	2.1	Ingestion	59.1	2.12	Arsenic	9.9	97.1	Ingestion	
		Cesium-137	0.3	Inhalation	0.4		Nickel	8.2	0.6	Inhalation	
		Chromium	0.1	Dermal	2.3		Uranium	80.3	2.3	Dermal	
		Neptunium-237	2.1	External	38.1						
		PCB, Total	2.7	Exposure							
		Technetium-99	0.2								

Table D8.117. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 9 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI								
Excavation Worker - subsurface	1.96E-05	Uranium-234	18.8	See Outdoor Worker (subsurface)	<1	Uranium	80.3		See Outdoor Worker (subsurface) for %									
		Uranium-235	7.7															
		Uranium-238	65.4															
Future Adult Resident - surface	4.76E-03	Arsenic	1.3	Ingestion	11.7	Uranium	18.6	18.6	Ingestion	86.2								
		Cesium-137	0.6	Inhalation	0.3						71.6	71.6	Inhalation	1.8				
		Chromium	0.1	Dermal	2.7										12.0	12.0	Dermal	
		Neptunium-237	4.3	External	85.3													
		PCB, Total	2.3	Exposure														
		Technetium-99	0.0															
		Total PAH	0.5															
		Uranium-234	3.6															
		Uranium-235	14.6															
Uranium-238	72.9																	
Future Child Resident - surface	4.76E-03	Arsenic	1.3	Ingestion	11.7	Uranium	10.8	10.8	Ingestion	95.7								
		Cesium-137	0.6	Inhalation	0.3						8.3	8.3	Inhalation	1.0				
		Chromium	0.1	Dermal	2.7										79.3	79.3	Dermal	3.3
		Neptunium-237	4.3	External	85.3													
		PCB, Total	2.3	Exposure														
		Technetium-99	0.0															
		Total PAH	0.5															
		Uranium-234	3.6															
		Uranium-235	14.6															
Uranium-238	72.9																	
Future Teen Recreational User - surface	2.20E-04	Arsenic	3.6	Ingestion	6.8	Arsenic	48.3	48.3	Ingestion	51.6								
		Cesium-137	0.5	Inhalation	0.6						3.2	3.2	Inhalation	3.2				
		Neptunium-237	3.8	Inhalation	0.6										45.2	45.2	Dermal	45.2
		PCB, Total	10.4	Dermal	15.7													
		Total PAH	2.5	External	76.9													
		Uranium-234	2.3	Exposure														
		Uranium-235	13.1															
		Uranium-238	63.7															

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.118. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 10

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Current Industrial Worker - surface	5.98E-06	PCB, Total	46.8	Ingestion	10.0	<1	*no COCs					
		Uranium-238	22.5	Inhalation	4.9							
			52.1	Dermal								
			33.0	External Exposure								
		Arsenic	10.6	Ingestion	10.0							
		Chromium	1.3	Inhalation	4.9							
Future Industrial Worker - surface	1.07E-04	Neptunium-237	9.1	Dermal	52.1		*no COCs					
		PCB, Total	46.8	External Exposure	33.0							
		Total PAH	4.3	Exposure								
		Uranium-234	1.2									
		Uranium-235	4.2									
		Uranium-238	22.5									
Outdoor Worker - surface	1.47E-04	Arsenic	18.4	Ingestion	51.6	1.06	Arsenic	15.9	Ingestion	95.7		
		Chromium	0.7	Inhalation	2.6		Iron	12.8	Inhalation	0.6		
		Neptunium-237	5.5	Dermal	28.0		Mercury	27.4	Dermal	3.6		
		PCB, Total	39.4	External Exposure	17.8		Nickel	10.3				
		Total PAH	3.8	Exposure			Uranium	31.6				
		Uranium-234	5.8									
		Uranium-235	2.6									
		Uranium-238	23.7									
Outdoor Worker - subsurface	1.30E-04	Arsenic	21.4	Ingestion	51.6	1.08	Arsenic	16.0	Ingestion	94.7		
		Chromium	0.8	Inhalation	3.0		Iron	12.3	Inhalation	1.7		
		Neptunium-237	4.8	Dermal	31.2		Mercury	26.6	Dermal	3.6		
		PCB, Total	44.3	External Exposure	14.2		Nickel	9.8				
		Total PAH	3.3	Exposure			Uranium	29.9				
		Uranium-234	5.2									
Uranium-235	2.4											
Uranium-238	17.7											

Table D8.118. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 14, EU 10 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.62E-06			See Outdoor Worker (subsurface)	<1		Uranium	29.9	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	4.06E-04	Arsenic	11.8	Ingestion	18.6	<1	Arsenic	28.1	Ingestion	93.9
		Chromium	0.7	Inhalation	2.5		Mercury	23.1	Inhalation	1.0
		Neptunium-237	12.0	Dermal	35.2		Uranium	26.7	Dermal	5.1
		PCB, Total	36.2	External Exposure	43.8					
		Total PAH	3.4	Exposure						
Uranium-234	1.2									
Uranium-235	5.5									
Uranium-238	29.1									
Future Child Resident - surface	4.06E-04	Arsenic	11.8	Ingestion	18.6	3.98	Arsenic	17.2	Ingestion	93.9
		Chromium	0.7	Inhalation	2.5		Iron	12.6	Inhalation	1.0
		Neptunium-237	12.0	Dermal	35.2		Mercury	26.9	Dermal	5.1
		PCB, Total	36.2	External Exposure	43.8		Nickel	10.5		
		Total PAH	3.4	Exposure			Uranium	31.0		
		Uranium-234	1.2							
		Uranium-235	5.5							
Uranium-238	29.1									
Future Teen Recreational User - surface	4.89E-05	Arsenic	13.0	Ingestion	3.4	<1	*no COCs			
		Neptunium-237	4.2	Inhalation	1.9					
		PCB, Total	64.2	Dermal	79.5					
		Total PAH	6.2	External Exposure	15.2					
		Uranium-238	9.8	Exposure						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs
 *No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.
 ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.
 Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.119. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 518

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.71E-05	Total PAH	99.3	Ingestion Inhalation Dermal External Exposure	7.6 0.2 92.1 0.1	<1	*no COCs			
Future Industrial Worker - surface	6.63E-04	PCB, Total Total PAH	0.5 99.3	Ingestion Inhalation Dermal External Exposure	7.6 0.2 92.1 0.1	<1	*no COCs			
Outdoor Worker - surface	8.09E-04	PCB, Total Total PAH Uranium-238	0.5 99.3 0.2	Ingestion Inhalation Dermal External Exposure	44.0 0.1 55.8 0.1	<1	Uranium	73.1	Ingestion Inhalation Dermal	97.8 0.5 1.7
Outdoor Worker - subsurface	8.25E-04	Arsenic PCB, Total Total PAH Uranium-238	1.9 0.5 97.4 0.2	Ingestion Inhalation Dermal External Exposure	44.6 0.1 55.2 0.1	<1	Uranium	57.1	Ingestion Inhalation Dermal	93.2 0.5 6.3

Table D8.119. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 518 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Excavation Worker - subsurface	1.03E-05	Total PAH	97.4	See Outdoor Worker (subsurface)	<1	<1			See Outdoor Worker (subsurface) for %			
Future Adult Resident - surface	2.02E-03	Carbazole	0.1	Ingestion	22.2	1.28	Cobalt Uranium	23.1	Ingestion	96.8		
		PCB, Total	0.5	Inhalation	0.1						72.5	0.8
		Total PAH	99.2	Dermal	77.5							
		Uranium-238	0.2	External Exposure	0.2						2.4	
Future Child Resident - surface	2.02E-03	Carbazole	0.1	Ingestion	22.2	1.28	Cobalt Uranium	23.1	Ingestion	96.8		
		PCB, Total	0.5	Inhalation	0.1						72.5	0.8
		Total PAH	99.2	Dermal	77.5							
		Uranium-238	0.2	External Exposure	0.2						2.4	
Future Teen Recreational User - surface	4.36E-04	PCB, Total	0.5	Ingestion	2.1	<1	*no COCs					
		Total PAH	99.4	Inhalation	0.1							
				Dermal	97.8							
				External Exposure	0.0							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.120. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 1

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	1.04E-06	*no COCs			<1		*no COCs			
Future Industrial Worker - surface	1.87E-05	Cesium-137 Chromium Neptunium-237 Uranium-238	59.9 5.6 13.0 12.4	Ingestion Inhalation Dermal External Exposure	5.7 6.2 2.7 85.4	<1	*no COCs			
Outdoor Worker - surface	2.06E-05	Cesium-137 Neptunium-237 Thorium-230 Uranium-238	40.5 9.7 25.1 16.3	Ingestion Inhalation Dermal External Exposure	36.8 4.1 1.8 57.3	<1	Mercury	43.5	Ingestion Inhalation Dermal	99.1 0.9
Outdoor Worker - subsurface	4.05E-05	Arsenic Cesium-137 Chromium Neptunium-237 Thorium-230 Uranium-238	52.5 18.3 3.6 4.0 11.5 7.8	Ingestion Inhalation Dermal External Exposure	57.6 3.9 12.8 25.7	<1	Arsenic Cobalt Mercury	21.7 20.6 20.2	Ingestion Inhalation Dermal	92.1 3.0 4.9

Table D8.120. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 1 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	8.83E-05	Cesium-137 Chromium Neptunium-237 Thorium-230 Total PAH Uranium-235 Uranium-238	63.7 2.3 13.8 3.6 1.9 1.8 12.9	Ingestion Inhalation Dermal External Exposure	5.1 2.5 1.4 91.0	<1	*no COCs			
Future Child Resident - surface	8.83E-05	Cesium-137 Chromium Neptunium-237 Thorium-230 Total PAH Uranium-235 Uranium-238	63.7 2.3 13.8 3.6 1.9 1.8 12.9	Ingestion Inhalation Dermal External Exposure	5.1 2.5 1.4 91.0	1.05	Iron Mercury Nickel	27.1 43.3 17.2	Ingestion Inhalation Dermal	98.6 1.4
Future Teen Recreational User - surface	4.02E-06	Cesium-137	58.3	Ingestion Inhalation Dermal External Exposure	3.0 5.1 8.6 83.2	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.121. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 2

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	8.92E-06	Chromium Total PAH Uranium-238	24.8	Ingestion	5.9	<1	*no COCs			
			60.0	Inhalation	25.3					
			11.7	Dermal	55.4					
				External Exposure	13.4					
Outdoor Worker - surface	9.94E-06	Chromium Total PAH Uranium-238	16.4	Ingestion	37.5	<1	Mercury	51.8	Ingestion Inhalation Dermal	95.3 4.7
			65.8	Inhalation	16.8					
			15.3	Dermal	36.8					
				External Exposure	8.9					
Outdoor Worker - subsurface	7.95E-05	Arsenic Chromium Radium-226 Total PAH Uranium-238	29.9	Ingestion	30.1	<1	Arsenic Mercury	35.7 33.1	Ingestion Inhalation Dermal	88.5 3.4 8.1
			2.1	Inhalation	2.1					
			59.5	Dermal	10.5					
			6.6	External Exposure	57.3					
			1.7							

Table D8.121. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 2 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.72E-05	Chromium Neptunium-237 Total PAH Uranium-238	15.8 5.1 60.0 18.9	Ingestion Inhalation Dermal External Exposure	15.1 16.1 46.6 22.2	<1	*no COCs			
Future Child Resident - surface	2.72E-05	Chromium Neptunium-237 Total PAH Uranium-238	15.8 5.1 60.0 18.9	Ingestion Inhalation Dermal External Exposure	15.1 16.1 46.6 22.2	1.01	Manganese Mercury Nickel Uranium	11.0 50.4 21.4 16.8	Ingestion Inhalation Dermal	92.6 7.4
Future Teen Recreational User - surface	4.20E-06	Total PAH	83.9	Ingestion Inhalation Dermal External Exposure	2.1 9.8 82.2 6.0	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.122. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 3

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	4.26E-06	Chromium Total PAH	30.9	Ingestion	6.0	<1	*no COCs				
			46.8	Inhalation Dermal External Exposure	31.7 43.2 19.2						
Outdoor Worker - surface	4.77E-06	Total PAH Uranium-238	51.1	Ingestion	37.8	<1	*no COCs				
			28.1	Inhalation Dermal External Exposure	20.9 28.6 12.7						
Outdoor Worker - subsurface	2.95E-05	Arsenic Chromium Total PAH Uranium-238	85.4	Ingestion	70.4	<1	Arsenic	46.8		Ingestion Inhalation Dermal	88.3 1.1 10.6
			5.5	Inhalation	5.6						
			5.2	Dermal	22.3						
			3.9	External Exposure	1.7						

Table D8.122. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 3 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.32E-05	Chromium Total PAH Uranium-238	19.3 46.0 34.3	Ingestion Inhalation Dermal External Exposure	13.4 19.8 35.7 31.2	<1	*no COCs			
Future Child Resident - surface	1.32E-05	Chromium Total PAH Uranium-238	19.3 46.0 34.3	Ingestion Inhalation Dermal External Exposure	13.4 19.8 35.7 31.2	<1	Nickel	54.5	Ingestion Inhalation Dermal	95.7 4.3
Future Teen Recreational User - surface	1.74E-06	Total PAH	75.4	Ingestion Inhalation Dermal External Exposure	2.2 14.1 73.8 9.9	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.123. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 4

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	1.76E-05	Chromium	7.2	Ingestion	6.6	<1	*no COCs			
		Neptunium-237	15.5	Inhalation	7.5					
		Total PAH	52.9	Dermal	48.8					
		Uranium-238	20.9	External Exposure	37.1					
Outdoor Worker - surface	2.05E-05	Neptunium-237	11.0	Ingestion	40.4	<1	Mercury	53.8	Ingestion Inhalation Dermal	98.7 1.3
		Total PAH	55.6	Inhalation	4.8					
		Uranium-238	26.1	Dermal	31.1					
				External Exposure	23.7					
Outdoor Worker - subsurface	4.37E-05	Arsenic	51.6	Ingestion	58.8	<1	Arsenic Mercury	28.6 22.8	Ingestion Inhalation Dermal	90.7 2.6 6.8
		Chromium	3.7	Inhalation	3.8					
		Neptunium-237	5.2	Dermal	26.3					
		Total PAH	26.1	External Exposure	11.1					
Uranium-238	12.2									

Table D8.123. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 4 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	6.58E-05	Chromium	3.7	Ingestion	12.4	<1	*no COCs			
		Neptunium-237	20.8	Inhalation	3.9					
		Total PAH	43.2	Dermal	33.5					
		Uranium-235	4.7	External Exposure	50.1					
		Uranium-238	27.5							
Future Child Resident - surface	6.58E-05	Chromium	3.7	Ingestion	12.4	<1	Mercury Nickel Uranium	53.4 25.3 13.3	Ingestion Inhalation Dermal	98.0 2.0
		Neptunium-237	20.8	Inhalation	3.9					
		Total PAH	43.2	Dermal	33.5					
		Uranium-235	4.7	External Exposure	50.1					
		Uranium-238	27.5							
Future Teen Recreational User - surface	7.81E-06	Total PAH	78.7	Ingestion Inhalation Dermal External Exposure	2.3 3.1 77.0 17.6	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.124. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 5

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI	
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs				
Future Industrial Worker - surface	9.20E-06	Chromium Total PAH	13.3	Ingestion	6.5	<1	*no COCs				
			71.1	Inhalation Dermal External Exposure	13.6 65.6 14.3						
Outdoor Worker - surface	1.06E-05	Total PAH Uranium-238	75.3	Ingestion	40.0	<1	*no COCs				
			11.7	Inhalation Dermal External Exposure	8.7 42.1 9.2						
Outdoor Worker - subsurface	3.49E-05	Arsenic Chromium Total PAH Uranium-238	68.8	Ingestion	65.3	<1	Arsenic	38.6		Ingestion Inhalation Dermal	88.5 2.8 8.7
			3.5	Inhalation	3.6						
			22.9	Dermal	28.4						
			3.5	External Exposure	2.8						

Table D8.124. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 520, EU 5 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI		
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %			
Future Adult Resident - surface	2.94E-05	Chromium	8.1	Ingestion	16.5	<1	*no COCs					
		Neptunium-237	9.8	Inhalation	8.2							
		Total PAH	67.8	Dermal	52.7							
		Uranium-238	14.3	External Exposure	22.6							
Future Child Resident - surface	2.94E-05	Chromium	8.1	Ingestion	16.5	<1	Nickel	76.7	Ingestion	94.1		
		Neptunium-237	9.8	Inhalation	8.2						Inhalation	5.9
		Total PAH	67.8	Dermal	52.7							
		Uranium-238	14.3	External Exposure	22.6							
Future Teen Recreational User - surface	4.82E-06	Total PAH	89.3	Ingestion	2.1	<1	*no COCs					
				Inhalation	4.7							
				Dermal	87.4							
				External Exposure	5.7							

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.125. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 81

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	4.90E-05	PCB, Total	97.3	Ingestion	6.8	<1	*no COCs			
			7.3	Inhalation	7.3					
			85.8	Dermal	85.8					
			0.1	External Exposure	0.1					
Future Industrial Worker - surface	8.75E-04	Arsenic Chromium PCB, Total Total PAH Uranium-238	1.2	Ingestion	6.8	1.17	Uranium	92.5	Ingestion Inhalation Dermal	93.6 2.4 4.0
			0.3	Inhalation	7.3					
			97.3	Dermal	85.8					
			1.1	External Exposure	0.1					
			0.2							
Outdoor Worker - surface	1.03E-03	Arsenic Chromium PCB, Total Total PAH Uranium-238	2.4	Ingestion	41.1	7.85	Arsenic Uranium	2.0 96.1	Ingestion Inhalation Dermal	99.3 0.3 0.4
			0.2	Inhalation	4.6					
			96.1	Dermal	54.2					
			1.1	External Exposure	0.1					
			0.2							
Outdoor Worker - subsurface	1.03E-03	Arsenic Chromium PCB, Total Total PAH Uranium-238	2.6	Ingestion	41.2	8.11	Arsenic Cobalt Uranium	2.1 2.3 93.1	Ingestion Inhalation Dermal	99.0 0.5 0.5
			0.2	Inhalation	4.5					
			96.0	Dermal	54.2					
			1.0	External Exposure	0.1					
			0.2							

Table D8.125. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 81 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.28E-05	PCB, Total	96.0	See Outdoor Worker (subsurface)	2.53	Uranium	93.1	See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.59E-03	Arsenic	1.7	Ingestion	3.18	Arsenic Uranium	4.0	Ingestion	96.7
		Chromium	0.2	Inhalation				0.8	
		PCB, Total	96.7	Dermal				2.5	
Future Child Resident - surface	2.59E-03	Total PAH	1.1	External Exposure	28.98	Aluminum Arsenic Mercury Uranium	0.5	Ingestion	99.0
		Uranium-238	0.3	Inhalation				0.4	
		Arsenic	1.7	Dermal				0.6	
		Chromium	0.2	External Exposure					
		PCB, Total	96.7						
Future Teen Recreational User - surface	5.47E-04	Total PAH	1.1	Ingestion	<1	Uranium	83.0	Ingestion	84.0
		Uranium-238	0.3	Inhalation				2.1	
		Arsenic	1.1	Dermal				13.8	
		PCB, Total	97.7	External Exposure					
		Total PAH	1.1						

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.126. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 153

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.18E-06	PCB, Total Total PAH	64.9 35.1	Ingestion Inhalation Dermal External Exposure	6.9 4.7 88.4	<1	*no COCs			
Outdoor Worker - surface	4.93E-06	PCB, Total Total PAH	63.7 36.3	Ingestion Inhalation Dermal External Exposure	41.6 2.9 55.5	<1	*no COCs			
Outdoor Worker - subsurface	3.07E-05	Arsenic Chromium PCB, Total Total PAH	77.8 5.3 12.0 4.9	Ingestion Inhalation Dermal External Exposure	67.1 5.9 27.0	<1	Arsenic	76.0	Ingestion Inhalation Dermal	77.4 5.4 17.2

Table D8.126. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 153 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.24E-05	PCB, Total Total PAH	64.1 35.9	Ingestion Inhalation Dermal External Exposure	20.8 3.1 76.1	<1	*no COCs			
Future Child Resident - surface	1.24E-05	PCB, Total Total PAH	64.1 35.9	Ingestion Inhalation Dermal External Exposure	20.8 3.1 76.1	<1	*no COCs			
Future Teen Recreational User - surface	2.67E-06	PCB, Total	63.8	Ingestion Inhalation Dermal External Exposure	2.0 1.3 96.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.127. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 156

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI						
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs									
Future Industrial Worker - surface	5.91E-06	Chromium PCB, Total Total PAH Uranium-238	27.5	Ingestion	6.0	<1	*no COCs									
			27.0	Inhalation	29.6											
			23.6	Dermal	45.1											
			21.8	External Exposure	19.3											
Outdoor Worker - surface	6.63E-06	Chromium PCB, Total Total PAH Uranium-238	18.1	Ingestion	37.9	<1	Manganese Mercury	43.3	Ingestion	82.6						
			27.9	Inhalation	19.6						42.5	Inhalation	17.4			
			25.7	Dermal	29.8									Dermal		
			28.2	External Exposure											12.7	
Outdoor Worker - subsurface	3.38E-05	Arsenic Chromium PCB, Total Total PAH Uranium-238	79.2	Ingestion	68.6	<1	Arsenic Cobalt Manganese Mercury	25.8	Ingestion	86.5						
			4.6	Inhalation	5.0						31.1	Inhalation	7.7			
			5.5	Dermal	23.8									18.0	Dermal	5.8
			5.0	External Exposure	2.5											
			5.5	External Exposure												

Table D8.127. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 156 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.84E-05	Chromium PCB, Total Total PAH Uranium-238	17.1 25.5 23.0 34.3	Ingestion Inhalation Dermal External Exposure	13.4 18.4 37.1 31.2	<1	*no COCs			
Future Child Resident - surface	1.84E-05	Chromium PCB, Total Total PAH Uranium-238	17.1 25.5 23.0 34.3	Ingestion Inhalation Dermal External Exposure	13.4 18.4 37.1 31.2	1.09	Manganese Mercury	48.5 38.5	Ingestion Inhalation Dermal	74.8 25.2
Future Teen Recreational User - surface	2.48E-06	PCB, Total	40.5	Ingestion Inhalation Dermal External Exposure	2.2 12.9 75.2 9.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.128. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 160

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Outdoor Worker - surface	1.09E-06	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	44.0 0.1 56.0	<1	*no COCs			
Outdoor Worker - subsurface	2.31E-05	Arsenic Chromium Total PAH	85.9 4.9 9.1	Ingestion Inhalation Dermal External Exposure	70.4 5.0 24.6	<1	Arsenic	89.9	Ingestion Inhalation Dermal	79.3 0.3 20.3

Table D8.128. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 160 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.72E-06	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	22.2 0.1 77.7	<1	*no COCs			
Future Child Resident - surface	2.72E-06	Total PAH	100.0	Ingestion Inhalation Dermal External Exposure	22.2 0.1 77.7	<1	*no COCs			
Future Teen Recreational User - surface	<1E-6	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COPCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.129. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 163

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	4.39E-06	Chromium Total PAH	37.3 62.7	Ingestion Inhalation Dermal External Exposure	4.7 37.4 57.9	<1	*no COCs			
Outdoor Worker - surface	4.57E-06	Chromium Total PAH	26.5 73.5	Ingestion Inhalation Dermal External Exposure	32.3 26.6 41.1	<1	*no COCs			
Outdoor Worker - subsurface	2.78E-05	Arsenic Chromium Total PAH	86.8 5.2 7.9	Ingestion Inhalation Dermal External Exposure	70.6 5.3 24.2	<1	Arsenic	53.5	Ingestion Inhalation Dermal	87.5 0.4 12.1

Table D8.129. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 163 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	1.16E-05	Chromium Total PAH	27.5 72.5	Ingestion	16.1	<1	*no COCs			
				Inhalation	27.6					
				Dermal External Exposure	56.3					
Future Child Resident - surface	1.16E-05	Chromium Total PAH	27.5 72.5	Ingestion	16.1	<1	*no COCs			
				Inhalation	27.6					
				Dermal External Exposure	56.3					
Future Teen Recreational User - surface	2.11E-06	Total PAH	85.9	Ingestion	1.8	<1	*no COCs			
				Inhalation	14.2					
				Dermal External Exposure	84.0					

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.130. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 219

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	<1E-6	*no COCs				<1	*no COCs			
Future Industrial Worker - surface	5.57E-06	Neptunium-237	21.9	Ingestion	7.4	<1	*no COCs			
		Total PAH	22.8	Inhalation	0.3					
		Uranium-238	46.5	Dermal	21.0					
				External Exposure	71.3					
Outdoor Worker - surface	6.74E-06	Neptunium-237	15.0	Ingestion	43.3	<1	*no COCs			
		Total PAH	23.0	Inhalation	0.2					
		Uranium-238	55.7	Dermal	12.8					
				External Exposure	43.6					
Outdoor Worker - subsurface	6.74E-06	Neptunium-237	15.0	Ingestion	43.3	<1	*no COCs			
		Total PAH	23.0	Inhalation	0.2					
		Uranium-238	55.7	Dermal	12.8					
				External Exposure	43.6					

Table D8.130. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 219 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	<1E-6			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface) for %	
Future Adult Resident - surface	2.52E-05	Neptunium-237	24.4	Ingestion	8.5	<1	*no COCs			
		Total PAH	15.3	Inhalation	0.1					
		Uranium-235	9.7	Dermal	11.9					
		Uranium-238	50.5	External Exposure	79.5					
Future Child Resident - surface	2.52E-05	Neptunium-237	24.4	Ingestion	8.5	<1	*no COCs			
		Total PAH	15.3	Inhalation	0.1					
		Uranium-235	9.7	Dermal	11.9					
		Uranium-238	50.5	External Exposure	79.5					
Future Teen Recreational User - surface	1.71E-06	*no COCs				<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.

Table D8.131. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 488

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Current Industrial Worker - surface	3.82E-06	PCB, Total	80.5	Ingestion Inhalation Dermal External Exposure	6.2 5.8 75.2 12.9	<1	*no COCs			
Future Industrial Worker - surface	6.82E-05	Cesium-137 PCB, Total Total PAH Uranium-238	8.9 80.5 6.2 3.9	Ingestion Inhalation Dermal External Exposure	6.2 5.8 75.2 12.9	<1	*no COCs			
Outdoor Worker - surface	7.74E-05	Cesium-137 PCB, Total Total PAH Uranium-238	5.8 82.1 6.7 5.0	Ingestion Inhalation Dermal External Exposure	38.8 3.8 49.0 8.4	<1	*no COCs			
Outdoor Worker - subsurface	1.00E-04	Arsenic Cesium-137 Chromium PCB, Total Total PAH Uranium-238	21.4 4.5 1.3 63.5 5.1 3.9	Ingestion Inhalation Dermal External Exposure	46.6 4.2 42.7 6.5	<1	Arsenic	88.5	Ingestion Inhalation Dermal	79.6 0.3 20.0

Table D8.131. Summary of Risk Characterization Adjusted for Dermal Absorption for SWMU 488 (Continued)

Receptor	Total ELCR	COCs	%Total ELCR	Routes of Exposure	%Total ELCR	Total HI	COCs	%Total HI	Routes of Exposure	%Total HI
Excavation Worker - subsurface	1.25E-06			See Outdoor Worker (subsurface)		<1			See Outdoor Worker (subsurface)	
Future Adult Resident - surface	2.20E-04	Cesium-137 PCB, Total Total PAH Uranium-235 Uranium-238	13.9 73.5 5.8 0.9 6.0	Ingestion Inhalation Dermal External Exposure	16.6 3.5 59.8 20.1	<1	*no COCs			
Future Child Resident - surface	2.20E-04	Cesium-137 PCB, Total Total PAH Uranium-235 Uranium-238	13.9 73.5 5.8 0.9 6.0	Ingestion Inhalation Dermal External Exposure	16.6 3.5 59.8 20.1	<1	*no COCs			
Future Teen Recreational User - surface	3.91E-05	Cesium-137 PCB, Total Total PAH	3.2 88.1 7.1	Ingestion Inhalation Dermal External Exposure	1.9 1.8 91.5 4.7	<1	*no COCs			

Total ELCR and total HI represent total risk or hazard summed across all routes of exposure for all COCs

*No COCs = There are no COCs. For Total HI <1, COCs listed are not applicable.

ELCR for Future Adult Resident and Future Child Resident are the combined lifetime scenario.

Outdoor Worker – subsurface and Excavation Worker – subsurface receptors include exposure to surface soils.